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ABSTRACT

A concept-based introduction to transportation brokerage is provided in this instructional module for undergraduate and graduate transportation-related courses for disciplines such as engineering, business, marketing, and technology. The concept of transportation brokerage is defined as an assignment of the management of a specific element of a city's or region's transit needs to an independent agency or firm. The components of a brokerage operation are described, along with problems and issues associated with the adoption of such a system. Attention is directed to brokerage operation variations, the process of market segmentation and its uses as a planning technique for transportation brokerage; the importance of community support; various federal agencies that provide financial support; funding channels for integrated transportation systems; major barriers to innovative transportation systems; the complexities of implementing a brokerage operation; characteristics of transportation contracts; managing a brokerage operation; and use of evaluation and promotion to maintain high efficiency for the system. Key ideas are illustrated by case histories and examples. An eight-page bibliography is appended. (SW)

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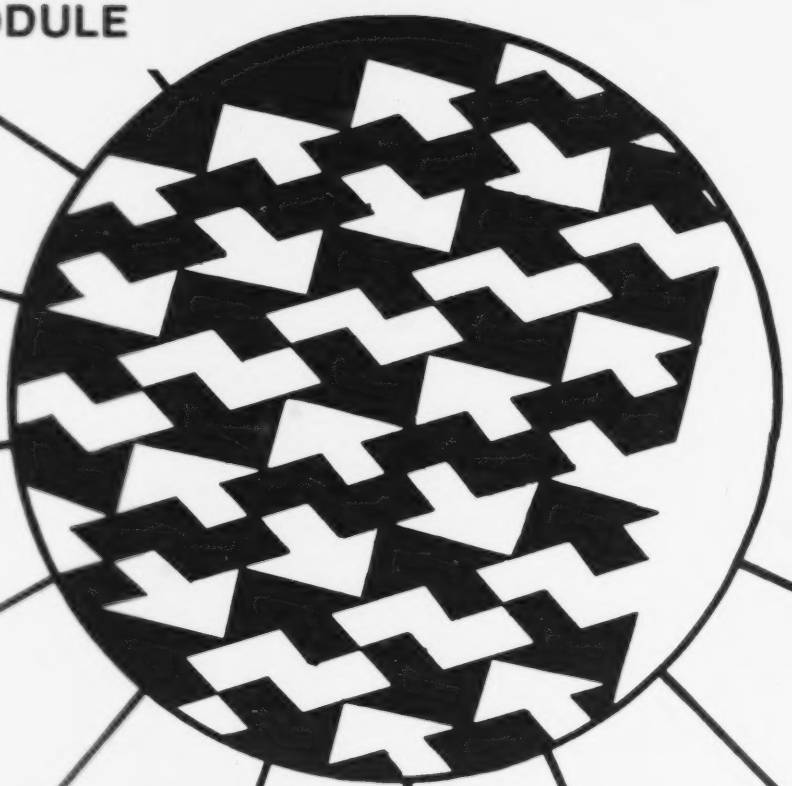

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16. Abstract

This module is intended to provide a broad, concept-based introduction to the topic of transportation brokerage for use in both undergraduate and graduate transportation-related courses. The material is designed to be useful in many disciplines including engineering, business, marketing, and technology.

The concept of transportation brokerage is defined as an assignment of the management of a specific element of a city's or region's transit needs to an independent agency or firm. This module describes the components of a brokerage operation and the problems and issues associated with the adoption of such a system. Key ideas are illustrated by the use of case histories and examples where possible.

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Prepared by
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West Virginia University

For
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Management Demonstrations

Urban Mass Transportation
Administration

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Transportation Brokerage

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PROFESSOR'S INTRODUCTION

Project Purpose

Since the founding of the Service and Methods Demonstration Program (SMD) in 1974, the Urban Mass Transportation Administration (UMTA) has been intimately involved in the development and diffusion of innovations related to mass transportation. After a decade of experiments and demonstrations, valuable insights and techniques have emerged.

However, students graduating with transportation degrees are often unaware of much of the information which UMTA has developed. These modules were designed to introduce future transportation professionals and people with related interests to five areas where new ideas have proven important in the planning and management of public transportation systems. The topics are:

- Market Segmentation Planning;
- Paratransit;
- Transportation Brokerage;
- Rural Public Transportation; and
- Public Transportation Pricing.

The topics are defined at the end of this introduction and discussed in the General Introduction.

Description of the Modules

These modules are intended to provide a broad, concept-based introduction to each of the five topics for use in both undergraduate and graduate transportation-related courses. The material is designed to be useful in many disciplines, including engineering, business, planning, marketing, public administration, and technology.

One of the major findings of our phone interview in February 1983 was that professors want curriculum packages to be flexible. These modules were designed to be taught for one to three classroom hours. The module text may be used in a number of ways including uses as:

- Lecture notes;
- Student homework readings;
- Overhead transparencies from illustrations; and
- In-class reading and discussion.

All graphic materials labeled as illustrations are designed to be used as overhead projections while graphic materials labeled figures are designed for photocopying.

Professors should feel free to use these materials to supplement regular course design and materials in any way they wish. However, we have placed asterisks in the Table of Contents after sections which we suggest you concentrate on if you only have one hour to teach the module topic. At

the end of each of the three sections of the module, there are Student Review Questions based on the preceding material.

The topics of the five modules have a significant content overlap which is reflected in the module texts themselves. Therefore, some module sections are virtually repeated from one module to another. Professors utilizing more than one of the modules should make allowances for this in planning their presentations.

Persons wishing more detailed and in-depth information on particular topics should refer to the list of references at the end of each module. Sources published by UMTA may be located through the UMTRIS computer database on the DIALOG system or from the National Technical Information Service (NTIS). It may also be possible to obtain recent UMTA Technical Reports and a current bibliography from U.S. DOT/TSC, Service Assessment Division (DTS-64), Kendall Square, Cambridge, MA 02142.

Module Topic Definitions

Market Segmentation

Market Segmentation is a transportation planning approach which involves identifying groups in a market that are "homogeneous with respect to important criteria that influence their travel choices" (Nelson, TRR 823, p. 8).

This approach is associated with integrated mobility-based transportation planning and allows the consideration of a variety of solutions to individual travel needs and markets.

Paratransit

Paratransit refers to modes of passenger transportation which are on a continuum between the private automobile and conventional transit. They are usually available to the general public and able to operate over the street and highway system (Kirby, 1974, pp. 1, 9). Paratransit generally refers to modes such as dial-a-ride, shared-ride taxi, jitneys, vanpools, and so on.

Transportation Brokerage

The transportation broker identifies the transportation needs and demands of various market segments and then matches these needs with available transportation resources. The broker also may resolve barriers to innovative transportation arrangements and implement those arrangements through contracts with social service agencies, employers and private operators. Brokerage is a concept which highlights many of the roles a transportation manager can undertake to provide mobility comprehensively and cost-effectively.

Rural Public Transportation

Rural public transportation involves systems in rural and small urban areas with populations under 50,000 people. Public transportation services in rural areas have often been provided solely by social service agencies serving their clients. New federal programs have facilitated the development of rural systems open to the public but strong local involvement and creativity are needed to create and support such services.

Public Transportation Pricing

Public transportation pricing systems are composed of fare structures and fare collection mechanisms. They are based on consideration of the system users, politics, funding sources, system costs, and system service characteristics. Planning pricing systems involves the balancing of many complex demands. Higher fares often lead to increased revenue generation but they can decrease ridership thereby lowering the social benefits of transit service. Complicated fare systems can promote equity among riders but they can make fares difficult to collect efficiently.

GENERAL INTRODUCTION

Historically, mass transportation in the United States was almost always provided by private, profit-seeking enterprises. The public's interest was usually protected through regulation by a public utility commission. Such commissions controlled entry into the transit business, fares, and the types of service offered.

As the number of automobiles and the quality of roads increased, mass transit ridership suffered a major decline. At the end of World War II, 37% of commuters were riding to work on public transit. By 1979, this figure had fallen to 6%; and there was an automobile for every two Americans. An expanding economy permitted many urban residents to purchase cars and suburban houses.

Mass transportation did not adapt to these changes, and private enterprise gradually withdrew from providing such services. The federal government began to provide financial assistance for transit systems which permitted local governments to take control of them. In the 1960s, the federal government initiated operating subsidies to help curb deficits.

As federal assistance for transportation systems grew, it became evident that the government was spending

x

increasing sums of money to support transportation systems which were not adjusting to changing conditions. Research into alternative methods of providing public mobility was a necessity. In 1964 Congress created the Urban Mass Transportation Administration (UMTA) to "research, develop, and demonstrate projects in urban mass transportation."

In 1974 UMTA created the Service and Methods Demonstration (SMD) Program to promote the development and widespread adoption of innovative transit services and transportation management techniques. Some of the areas in which UMTA has facilitated major changes are bus and rail equipment design, automation, paratransit, brokerage, integrated planning, and other management innovations.

These modules were designed to introduce students of transportation to information on five topics: market segmentation planning, paratransit, transportation brokerage, rural public transportation, and public transportation pricing. The information in the modules is based on the results of numerous UMTA-funded demonstration and research projects related to these topics. The five topics are introduced on the following pages.

New Directions

Market Segmentation

Public transportation today involves a variety of transportation modes with varying costs and characteristics. A transportation planner must have new planning tools to cope with the complex array of possible systems.

Instead of focusing on transportation systems, the planner should begin by studying the actual mobility needs of the people to be served. Needs-based transportation planning is the only way to ensure services that are fully used and cost-effective. New or modified services which meet the needs of certain groups must then be marketed to inform people of the service's benefits for them.

There are four basic steps to the Market Segmentation planning approach:

1. Market Segmentation Analysis
2. Assessment of Existing Services
3. Analysis of Unmet Needs
4. Targeted Design

Paratransit

Paratransit refers to any public transportation mode which falls on the continuum between the large fixed-route systems (bus, train, etc.) and the private automobile. This includes demand-responsive modes such as Dial-A-Ride and ridesharing modes such as vanpools. Paratransit

systems are designed to be flexible, cost-effective,and targeted to specific needs, but they cannot move large numbers of people on a single route as cheaply as mass transit systems.

Paratransit is being used to serve commuters, the handicaped, the elderly, and others. It works well in low-density or special needs situations where conventional mass transit would be too expensive. Paratransit also can work well as a feeder service for a conventional system.

Brokerage

Suppose a city decides to provide its elderly with a partially subsidized door-to-door service. It would be very expensive to buy cars, maintain them, hire drivers, and so on. It is cheaper to contract with local taxi companies who already have facilities and a workforce. The taxi company provides the service, the elderly give the drivers tickets (provided by the broker) good for part of each fare, and the city buys the tickets back from the taxi company.

In such a case, the transportation planner acts as a broker who matches transportation needs with available services. Rather than operating as a carrier, the transportation broker is primarily concerned with increasing people's mobility with equitable and cost-effective services.

Brokerage is useful in many areas of transportation management, particularly in the provision of flexible, low-cost paratransit services. The concept of brokerage highlights the new types of roles transportation managers can undertake in today's complex operating environments.

Rural Public Transportation

Rural areas are characterized by sparse populations, often difficult road conditions, and limited resources, yet people in rural areas need mobility for access to jobs, shopping and health care. Most rural people either own autos or rely on informal networks based on them. Public transportation in rural areas has usually been provided solely by social service agencies serving their clients. Federal funding has facilitated the development of systems open to the public but strong local involvement and creativity are needed to create and support such services.

Rural systems have employed many innovations including all types of cooperative arrangements, extensive use of volunteers, and experiments with non-traditional vehicles such as school buses and postal vehicles. Rural public transportation fills pressing needs but due to the difficulties of arranging and financing it, strong local support and creativity are essential.

Public Transportation Pricing

Public transportation pricing systems are composed of fare structures and fare collection mechanisms. Fare structures deal with how much system riders pay to use the service while collection mechanisms range from simple cash fares to complex postpayment and user-subsidy ticket systems.

Planning the pricing of a public transportation service is an integral part of planning the overall transportation system. Fares and collection methods are based on factors such as who the system users are, political considerations, sources of funding, costs of the system, and system service characteristics. Planning pricing systems involves the balancing of many complex demands.

Higher fares often lead to increased revenue generation but they can decrease ridership thereby lowering the social benefits of transit service. Complicated fare systems can promote equity among riders by permitting, for example, discounts for the elderly. However, too many complications can make fares difficult for bus drivers to collect efficiently.

THE CONCEPT OF TRANSPORTATION BROKERAGE

The purposes of this section are:

- To familiarize the students with the concept of brokerage as it relates to transportation.
- To provide the student with a definition of brokerage.

Brokerage is a management structure. The transportation professional acting as a broker, matches resources with needs through the medium of contracts or sales, without directly providing services. The transportation broker serves as:

- A clearinghouse for users of transportation and providers of transportation services,
- a resource-manager concerned with cost-effective and convenient service for the public, and
- an advocate for change of current legal and institutional barriers to better transportation.

TSM and the Broker

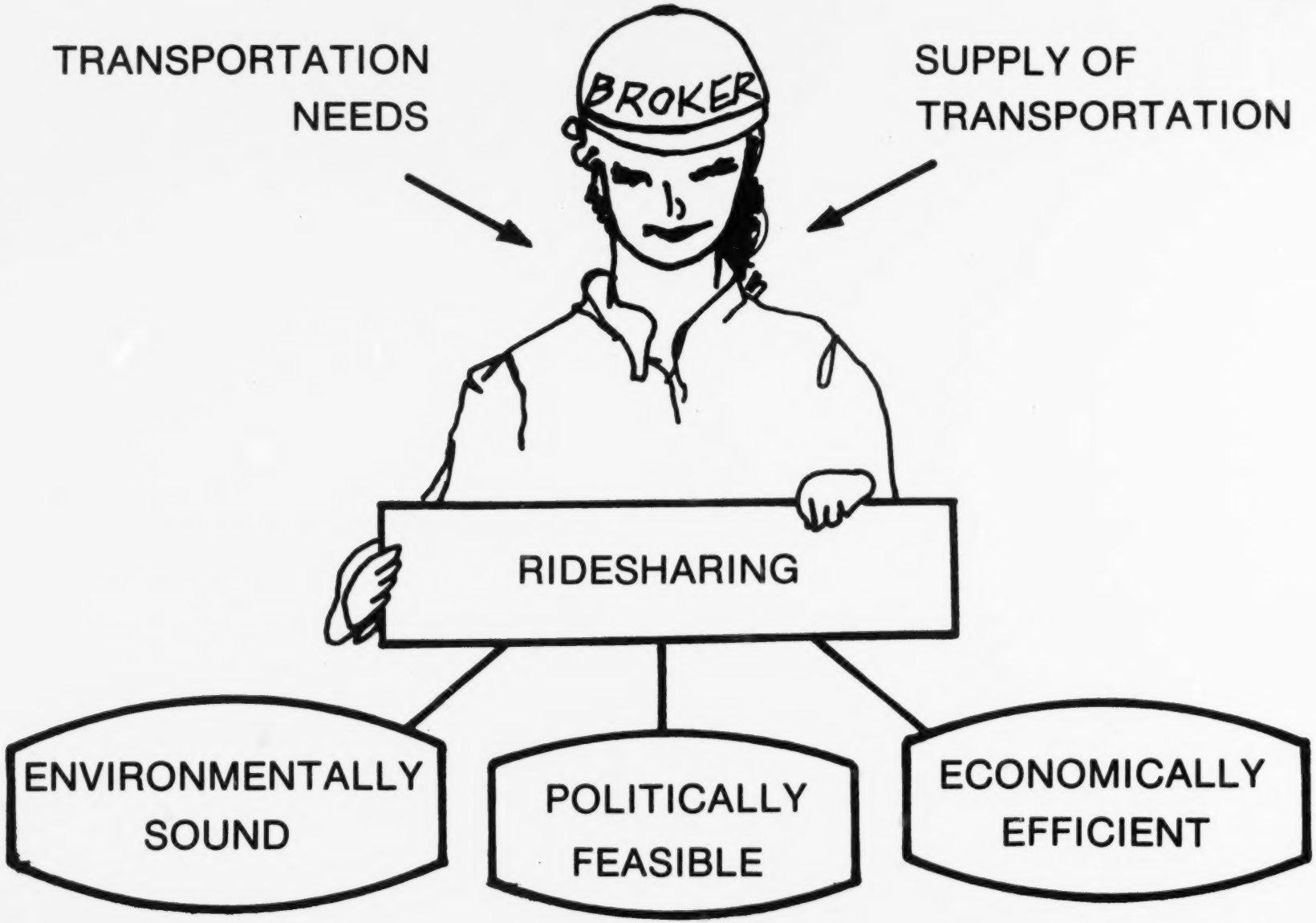
Transportation systems management (TSM) is a program to promote low-cost, non-capital-intensive, and quickly implementable means of improving highway traffic flow, reducing vehicle-miles of travel, and increasing highway capacity. TSM focuses on improvements to the existing urban transportation system and on traffic engineering.

The broker, in managing an integrated system, may promote the use of shared-ride modes of transportation. Through the use of modes such as carpools, vanpools, and conventional mass transit, the broker works toward goals similar to those of TSM. These common goals include economic efficiency, environmental quality, political acceptability,and facility productivity. (See Illustration 1).

Why Brokerage

Many cities have found their single-system transit unable to fulfill every individual's mobility needs. In an attempt to increase local transit options, transportation brokerage operations are created in many areas with financial support from the government. The broker, in many of these cases, acted as the director of a central organization which coordinated a system of transportation services.

Illustration 1. Promotion of Ridesharing Meets TSM Goals.



An example of this is the demonstration project which was organized in Westport, Connecticut. The Westport Demonstration was based on a major brokerage role played by the Westport Transit District (WTD) supported by a number of contractual relationships between WTD and the private sector. WTD provided regular and supplemental fixed-route service, shared ride taxi service, and special market services to local residents.

This demonstration project was successful in that it increased the mobility of many Westport residents. Success, however, does not come easily. Careful planning is needed before demonstrations of this kind can be implemented.

Planning with Brokerage

Transportation brokerage is founded on a consumer orientation, as opposed to a vehicle or system orientation. The brokerage process is complex in that consumer mobility needs are varied. In other words, there is no standard solution for the distribution of transportation. Each community has unique qualities pertaining to its requirements for transportation service.

The identification of those needs helps to determine the method of service which is most satisfactory. An in-depth analysis of the area, the people, and the transportation service options must be accomplished before

a system can be designed. In planning a transportation system with a brokerage management structure, the following steps are necessary for effective development. The person acting as the broker must:

- understand transportation needs,
- evaluate where transit may best met those needs,
- design a service to meet those needs,
- make people aware of the service, and
- persuade and develop an attitude that it is their system.

Potential Advantages

Through the integrated use of a variety of existing services--taxis, jitneys, school and church buses, social service vehicles, carpools, vanpools, and volunteers--a complementary relationship can be effectively established based on coordinated management of the total system. A brokerage approach offers several distinct advantages.

- o It can eliminate duplication of transportation while increasing the quality of service. For instance, two public agencies operating in the same city may have similar transportation services for their clients. The broker could become aware of this situation and provide the necessary communication between the agencies so that they might coordinate service.

- Brokerage can save money by better utilization of equipment, maintenance, facilities, and volume purchasing. An example of this can be seen in the case where a broker coordinated a service which used taxis and minibuses. One maintenance facility was provided for all of the vehicles.

- Brokerage can match transportation providers with transportation services, while increasing destination choice and departure times. A broker may locate an area or neighborhood not receiving adequate service and relay this information to the public transit service in the area. The transit service might issue a special bus for the area at the appropriate times and to the destinations chosen by the users.

- Brokerage can allow the efficient use of personnel and increase the availability of vehicles with accessbility features. For example, a broker could bring together agencies providing transportation service for the elderly and handicapped. In this way they might be able to pool resources and coordinate their services.

- Brokerage increases the efficiency of a transportation system by working to alleviate barriers. The broker, in many cases, has helped to eliminate insurance barriers for vanpool oerations.

Summary

The inherent flexibility of brokerage makes it useful in meeting a variety of transportation needs. Past experiences of success as well as failure in many demonstration projects have helped to identify critical factors in the planning, design, and implementation of transportation systems using the brokerage approach. Brokerage is a role existing public transportation managers can assume to meet specialized local transportation needs with flexible, cost-effective targeted services.

THE EVOLUTION OF BROKERAGE

The purposes of this section are:

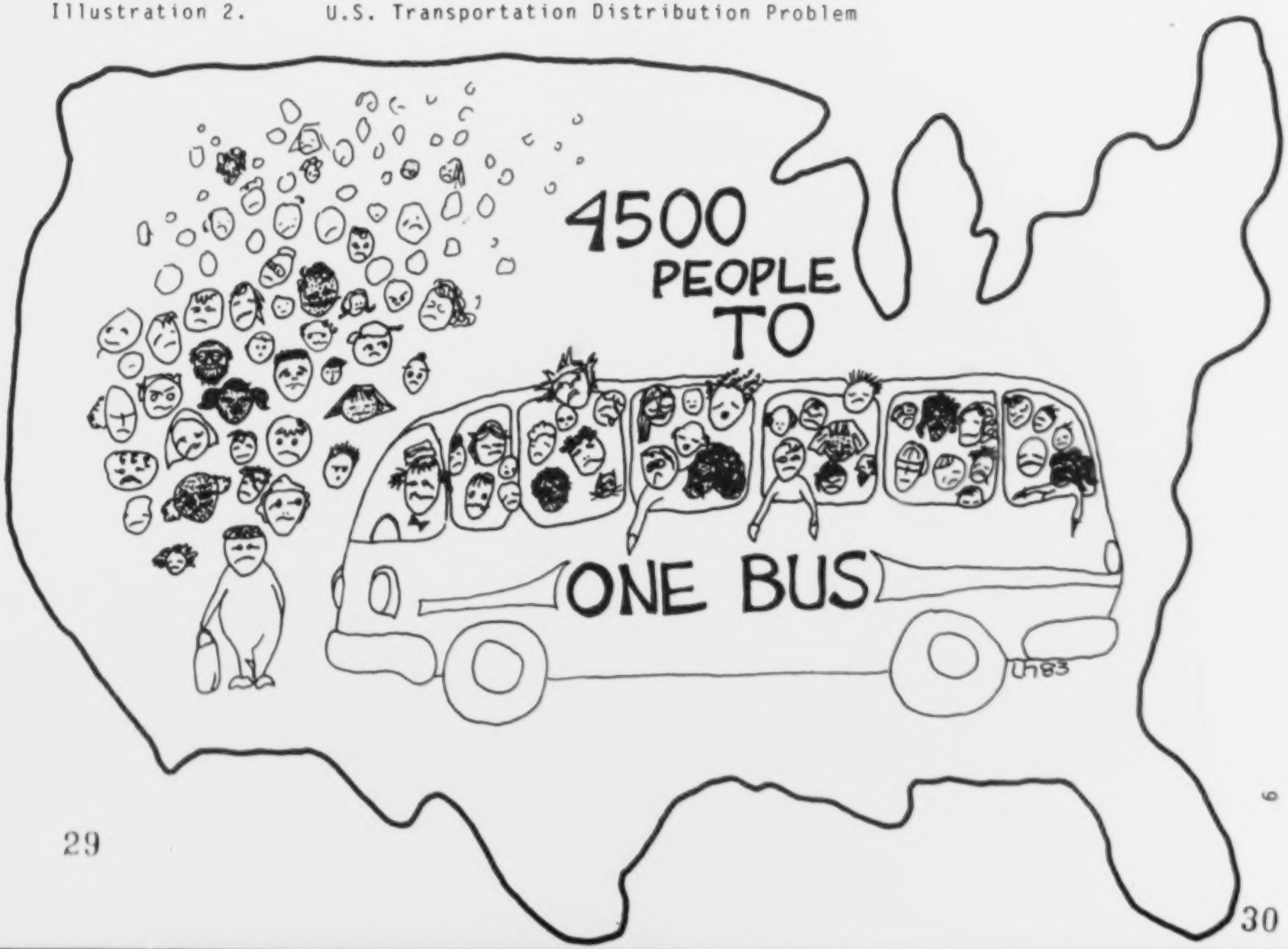
- To familiarize the student with the evolution of the transportation brokerage concept.
- To provide the student with cases studies which illustrate ways the broker can help solve modern transportation problems.

There are approximately 104 million private vehicles in this country. This works out to three automobile seats for each man, woman, and child in the United States. Only 60% of the population have access to these automobiles. In contrast, there are 4,500 non-drivers for every one public transportation vehicle, and most of these public vehicles are located in only a few major cities. The basic transportation problem, then, is not a shortage of transportation capacity, but rather a problem of the distribution of this capacity (see Illustration 2).

Need to Refocus and Coordinate Resources

Public transit vehicles are only 1% of the vehicles on the road. Consequently, it is important for transportation

Illustration 2. U.S. Transportation Distribution Problem



planners to consider the other 99% of the vehicles as options for the provisions of transportation services, particularly with respect to commuters (see Figure 1).

One demonstration project which recognized the use of alternatives to traditional public transit is known as the Share-A-Ride program. The Metropolitan Transit Commission of Minneapolis promoted and coordinated services for carpooling, vanpooling, and bus commuting for people who had been driving alone to work. Altogether, the Share-A-Ride program placed over 2,000 persons into carpools or vanpools.

Transportation planning is changing. The Transportation System Management (TSM) programs helped to refocus the planner's attention on the better use of privately-owned vehicles. A main strategy of TSM since 1969 has been to encourage more efficient use of taxis, carpools, vanpools, church buses, casual carriers, and volunteer drivers. This action was aimed at alleviating traffic congestion, particularly during peak-period travel. Other positive goals included better environmental quality and increased transportation accessibility.

Likewise, the transportation brokerage concept evolved to make more transportation available to more people and to use public transportation monies more efficiently. A single mode transportation system cannot meet the wide

Figure 1. Major Mode of Transportation to Work (1979).

MODE	UNITED STATES TOTAL	
	Number (000)	Percent
Total	54,104	100.0
Automobile or truck	46,368	85.7
Drive alone	37,129	68.6
Automobile	29,382	54.3
Truck	7,747	14.3
Carpool	9,240	17.1
Automobile	7,644	14.1
Truck	1,596	2.9
Public Transportation	3,219	5.9
Bus or street car	1,922	3.6
Subway or elevated	901	1.7
Railroad	323	0.6
Taxicab	73	0.1
Bicycle	309	0.6
Motorcycle	375	0.7
Walk only	2,117	3.9
Other means	256	0.5
Work at home	1.261	2.3
Not reported	200	0.4

SOURCE: U.S. Department of Commerce, Bureau of Census, Current Population Reports Special Studies Series P-23, No. 122. Journey to Work in U.S., 1979.

range of all mobility needs of a community. The transportation professional acting as a broker, given all the options available to the community, has the potential to meet many of those transportation needs by focusing on specific population segments and matching service accordingly.

The example below illustrates how transportation brokerage is used to successfully coordinate resources to provide alternative transportation services which satisfy a specific need.

Knoxville

TVA, Knoxville's major employer, expanded its downtown office complex. Employees requested that TVA build a multimillion dollar parking garage to accommodate 793 cars and compensate for the parking spaces taken by the new building. Instead, brokerage was used to promote a network of car, van, and buspools. This alternative transportation service proved to be a success in that it reduced the number of employees riding alone from 66 to 18 percent. Fuel used by TVA commuters dropped 50%. Traffic speed on Interstate 40 was increased significantly because of the program, and TVA saved $212,820 a year in parking costs.

Contracts to Meet Special Needs

In coordinating a transportation system, the broker must frequently cross public sector/private sector

boundaries. For example, in the human services market there are private non-profit transportation providers. Generally, these agencies' transportation services are intended to provide their clients access to agency-sponsored programs.

However, as human service agencies have expanded their provision of transportation, many agencies have become increasingly concerned with diversion of their staff and other resources for those operations. In many cases transportation brokers have recognized taxicab companies as a means of offering transportation service to such agencies. This reduces the strain on agency resources and provides a reasonably priced alternative.

An increasingly popular technique for integrating taxicab operators into the human service transportation market is through the use of user-side subsidies. In many areas where standard taxi service is available, public or non-profit agencies may provide financial assistance to specific individuals in order to make the cost of existing transportation less prohibitive. The broker may arrange for a special method of payment which requires the cooperation of the private operator or taxicab company. The two techniques which are commonly used are described below:

1. The user buys books of scrip tickets from the responsible public body at less than fare value.

When the transportation company receives the tickets, it turns them in to the public agency and is paid full fare value or a specified price. An example of this type of program was West Virginia's "TRIP" which helped to provide transportation for the elderly and for people in low income groups.

2. The user is given an identification card. When a trip is taken, the user shows the ID card, pays a reduced fare, and makes out a charge slip, or voucher, to the city for the balance. Examples include programs in: Danville, Illinois; Montgomery, Alabama; and Miami, Florida.

The broker can specifically target the users to receive subsidies as well as individually define the level of subsidy to each user.

Barriers to Change

Change and innovation have typically met with opposition. When making any proposal for alternatives to tradition, the transportation broker must recognize and deal with definite barriers. These barriers may be legal, regulatory, political, or attitudinal. For example, taxicabs are generally regulated by local government. Regulations usually impose certain responsibilities for guaranteed service availability and may offer certain exclusive rights in return. These regulations may cause

a good deal of conflict when considering a new type of service. Questions must be answered such as "How does the new system fit the old regulations?", and "Whose interest is involved in the decision?"

In addition to overcoming legal and regulatory barriers, persons acting as brokers must also work to gain the acceptance of the people. The community must be politically and financially supportive of the transportation system if it is to be a success. The broker must maintain a needs-based marketing approach from the conception throughout the life of the program. People must know how a service will meet their transportation needs before they will actually use the service. These barriers are discussed in greater depth later in this module.

Brokerage and Contracting Out

Transportation brokerage is a concept which was developed in the 1970s to capture the variety of means by which transportation professionals could match specialized local transportation needs with new and efficient services. A vanpool aids both its riders and other road users while not competing directly with existing transit systems. Similarly, a Dial-A-Ride service targeted to aid people who cannot ride buses does not affect the riders who can walk to bus stops.

Since the early 1980s many cities and towns have started to consider contracting out already existing municipal services such as trash collection or even fixed-route bus lines to private operators. Contracting-out is controversial and raises a number of issues which are not directly related to the transportation brokerage discussed in this module. The key issues relate to the rights of existing municipal employees and the public's right to high quality cost-effective public services.

These complex issues are outside the scope of this module. Brokerage is oriented to meeting specialized transportation needs with a variety of flexible services which should not negatively affect existing private or public services. Federal regulations require that new paratransit services not threaten the jobs of existing public workers and this is the basis on which transportation brokerage and related paratransit services were developed.

Summary

Transportation brokerage has evolved to help solve modern transportation problems. The transportation professional, acting as a middleperson between providers and users, can help provide solutions for the distribution of transportation. These solutions can be cost-effective, consumer-oriented, and specialized to meet individual needs.

TRANSPORTATION PLANNING AND BROKERAGE

The purposes of this section are:

- To describe brokerage operation variations.
- To familiarize the student with the process of market segmentation and its uses as a planning technique for transportation brokerage.

Sponsorship Influence

There are many different types of brokerage operations. The broker can be organized under the sponsorship of a city, a regional transportation authority, a state department of transportation, a nonprofit organization, or even a private corporation. The type of sponsorship will naturally influence the brokerage operation's area of concentration. For example, if a Chamber of Commerce acts as a broker, it might emphasize community transportation. A human service agency such as the Easter Seal Society might arrange trips for the transportation handicapped.

Management Structure

In considering the appropriate size of operations, the

natural flexibility of brokerage lends itself to the specific circumstances of the community. Through various studies and demonstration projects, the following generalities have evolved:

- In a very small town, the country store, or police or fire station could service as a ride information center.
- A medium-size city might employ a full-time staff to coordinate transportation services.
- In a metropolitan area, a central brokerage operation could plan service on a neighborhood basis, coordinating a number of services (e.g., taxis, van and carpools, and traffic controls) as part of an overall transportation plan.

The size and type of brokerage operation will dictate the necessary management organization. Large integrated transportation systems, in particular, require complex management structures for adequate communication and effective operation.

The success of any transportation service depends on how efficiently it meets the individual needs and preferences of potential users. Transportation planning requires a thorough knowledge of the people to be served and the transportation infrastructures of their cities. Similarly, before the transportation broker can begin

planning and arranging services, a great deal of information must be gathered and analyzed (see Illustration 3).

This planning process is required in order to gain the data which new systems or modifications of existing ones can be designed, implemented, and evluated. This process is generally broken down into the following four steps:

1. Market segmentation
2. Assessment of existing services
3. Analysis of unmet needs
4. Targeted design

(See Figure 2 for elaboration)

Market Segmentation Analysis - A Planning Technique

Market segments, or groups, are identified by various characteristics such as geography, population density variations, lifestyles, and attitudes. The analysis of market segments categorizes the population into groups according to needs and preferences, and estimates the size of each group. This analysis also determines the location of unmet needs. Assessment of existing services can determine ridership, location of services, their performance, and the economic feasibility of operating a system. Much of this information can be derived from current evaluations of public systems.

The transportation broker may use public records, existing literature, demographic analysis, and surveys of

Illustration 3. Planning for Brokerage.

Figure 2. Market Segmentation Planning

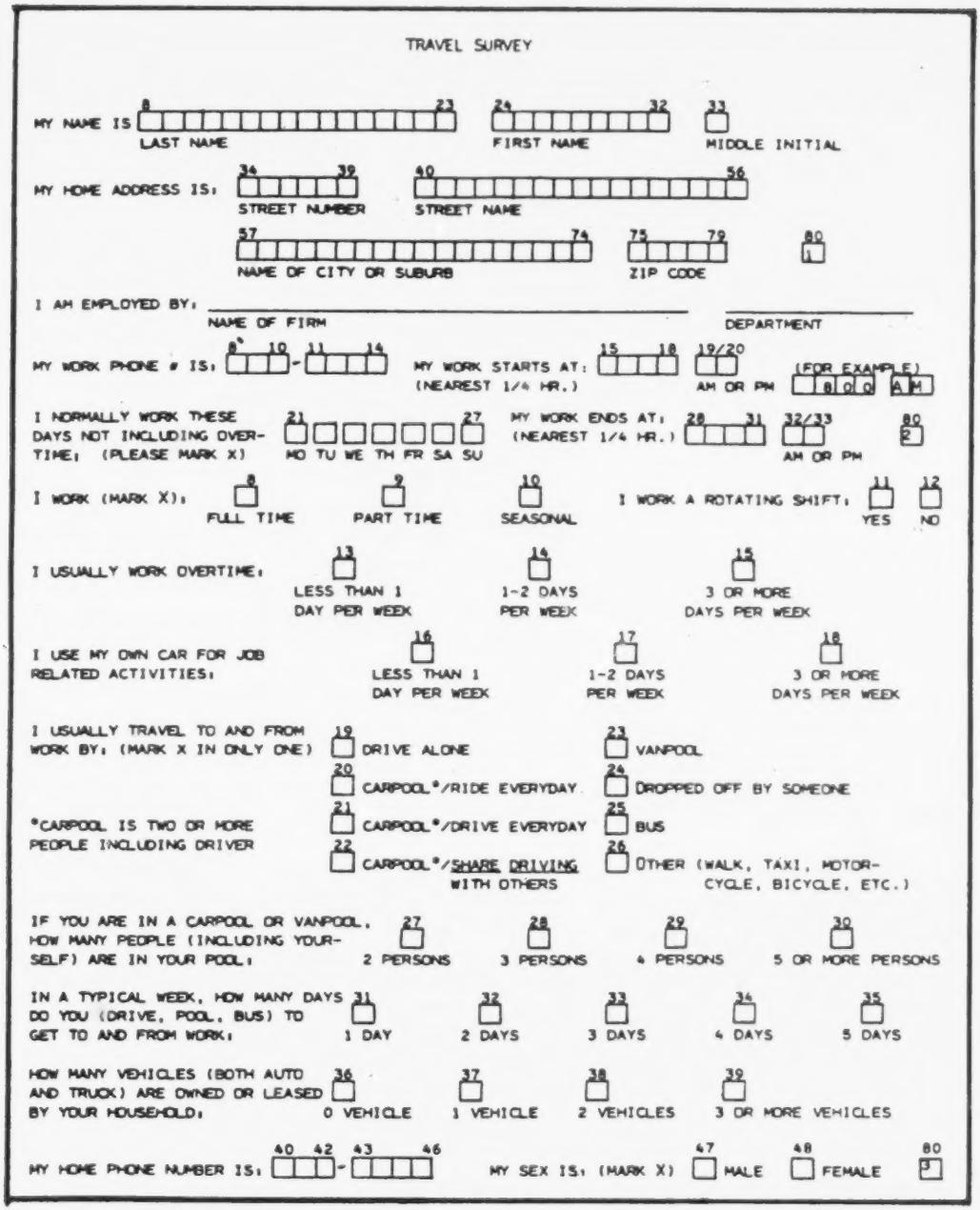
	Objectives:	Activities:
Market Segmentation Analysis	* who needs service * what services are needed * what criteria most influence travel choice	* research of public records * surveys of population samples * analysis of existing literature
Assessment of Existing Services	* what systems already exist (public and private) * how efficiently and effectively are existing systems performing	* analysis of distribution of existing systems * analysis of performance factors * determination of characteristics of existing systems and rider satisfaction
Analysis of Unmet Needs	* geographic service gaps * gaps in rider satisfaction * which existing systems can be better utilized	* analysis of market segmentation data * analysis of assessment data * comparison of market segmentation and assessment data
Targeted Design and Implementation	* how can existing systems be modified * what new systems are needed * what are the costs of modifications and new systems * what political and financial considerations must be accounted for	* design and costing of existing system modifications * design and costing of new systems * analysis of local political and financial concerns

agencies, groups, employers, and various system users as sources of information for use in determining market segments. Figure 3 shows a sample preliminary travel survey. Only with data such as this can brokers devise strategies which focus on specific markets and provide standards for evaluation. Figure 4 shows the possible segments a planner might use in assessing the transportation needs of diasabled and disadvantaged persons.

Minneapolis

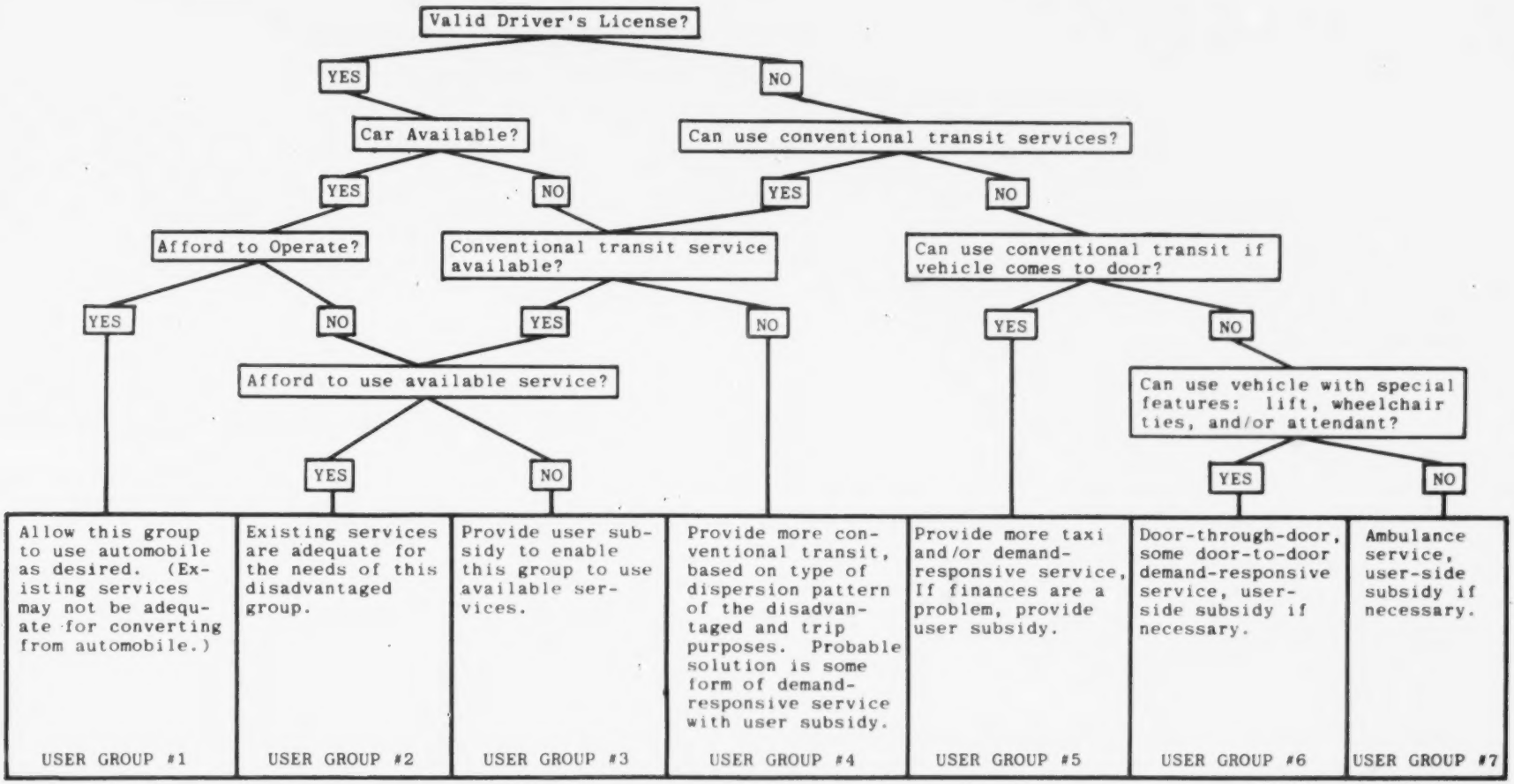
A demonstration project sponsored by the Service Methods Demonstration Program of the Urban Mass Transportation Administration (UMTA) was located in Minneapolis, Minnesota. This project promoted vanpooling for the commuters of the targeted areas. Market segmentation determined the three, multi-employer sites located outside of the central business districts of Minneapolis and St. Paul. The sites were small, well-defined areas of less than one-half mile radius containing at least 2,000 employees and at least two large employers of at least 250 workers. The employers were requested to sponsor the vanpooling program, appoint a coordinator, and conduct a travel survey. Following analysis of the travel data, service potentials were determined.

Figure 3. Preliminary Travel Survey


TRAVEL SURVEY
MY NAME IS
LAST NAME
FIRST NAME
MIDDLE INITIAL
MY HOME ADDRESS IS:
STREET NUMBER
STREET NAME
NAME OF CITY OR SUBURB
ZIP CODE
I AM EMPLOYED BY:
NAME OF FIRM
DEPARTMENT
MY WORK PHONE # IS:
MY WORK STARTS AT:
(NEAREST 1/4 HR.)
AM OR PM
(FOR EXAMPLE)
I NORMALLY WORK THESE DAYS NOT INCLUDING OVERTIME: (PLEASE MARK X)
MO TU WE TH FR SA SU
MY WORK ENDS AT:
(NEAREST 1/4 HR.)
AM OR PM
I WORK (MARK X):
FULL TIME
PART TIME
SEASONAL
I WORK A ROTATING SHIFT:
YES
NO
I USUALLY WORK OVERTIME:
LESS THAN 1 DAY PER WEEK
1-2 DAYS PER WEEK
3 OR MORE DAYS PER WEEK
I USE MY OWN CAR FOR JOB RELATED ACTIVITIES:
LESS THAN 1 DAY PER WEEK
1-2 DAYS PER WEEK
3 OR MORE DAYS PER WEEK
I USUALLY TRAVEL TO AND FROM WORK BY: (MARK X IN ONLY ONE)
DRIVE ALONE
CARPOOL*/RIDE EVERYDAY
CARPOOL*/DRIVE EVERYDAY
CARPOOL*/SHARE DRIVING WITH OTHERS
VANPOOL
DROPPED OFF BY SOMEONE
BUS
OTHER (WALK, TAXI, MOTORCYCLE, BICYCLE, ETC.)
*CARPOOL IS TWO OR MORE PEOPLE INCLUDING DRIVER
IF YOU ARE IN A CARPOOL OR VANPOOL, HOW MANY PEOPLE (INCLUDING YOURSELF) ARE IN YOUR POOL:
2 PERSONS
3 PERSONS
4 PERSONS
5 OR MORE PERSONS
IN A TYPICAL WEEK, HOW MANY DAYS DO YOU (DRIVE, POOL, BUS) TO GET TO AND FROM WORK:
1 DAY
2 DAYS
3 DAYS
4 DAYS
5 DAYS
HOW MANY VEHICLES (BOTH AUTO AND TRUCK) ARE OWNED OR LEASED BY YOUR HOUSEHOLD:
0 VEHICLE
1 VEHICLE
2 VEHICLES
3 OR MORE VEHICLES
MY HOME PHONE NUMBER IS:
MY SEX IS: (MARK X)
MALE
FEMALE

Source: Weisbrod and Eder, Evaluation of the Minneapolis Ridesharing Commuter Services Demonstration, June 1980

Figure 4. Possible Market Segments of the Transportation Disadvantaged


Valid Driver's License?
YES
NO
Car Available?
Can use conventional transit services?
YES
NO
YES
NO
Afford to Operate?
Conventional transit service available?
Can use conventional transit if vehicle comes to door?
YES
NO
YES
NO
YES
NO
Afford to use available service?
Can use vehicle with special features: lift, wheelchair ties, and/or attendant?
YES
NO
YES
NO
Allow this group to use automobile as desired. (Existing services may not be adequate for converting from automobile.)
USER GROUP #1
Existing services are adequate for the needs of this disadvantaged group.
USER GROUP #2
Provide user subsidy to enable this group to use available services.
USER GROUP #3
Provide more conventional transit, based on type of dispersion pattern of the disadvantaged and trip purposes. Probable solution is some form of demand-responsive service with user subsidy.
USER GROUP #4
Provide more taxi and/or demand-responsive service, If finances are a problem, provide user subsidy.
USER GROUP #5
Door-through-door, some door-to-door demand-responsive service, user-side subsidy if necessary.
USER GROUP #6
Ambulance service, user-side subsidy if necessary.
USER GROUP #7

SOURCE: National Cooperative Highway Research Progam Report #209.

One difficulty which needs consideration when planning a brokerage operation of this sort is that of commuters with staggered work schedules. In analyzing the needs of a particular market segment, the broker may use equations to determine potential ridership. For example, in the Minneapolis demonstration project, staggered hours made buspools difficult to form, but had much less impact on vanpools.

Since this early demonstration of vanpool promotion, it has become common for urban transportation organizations to promote employer-sponsored vanpool programs or to sponsor carpool matching themselves. The promotion of ridesharing has advanced from an experimental program to an accepted transportation system management practice.

The following relationship expresses the key variables related to pool information.

$$Pn = f(Wt, Cw)$$

where Pn = probablity of forming a pool of size n
Wt = size of workforce with common work schedule
Cw = clustering of workers' residential patterns
f = is a function of

In other words, the probability of forming a pool of a certain size (car, van, or bus) depends on the number of commuters with common work schedules and on the clustering of their residential patterns.

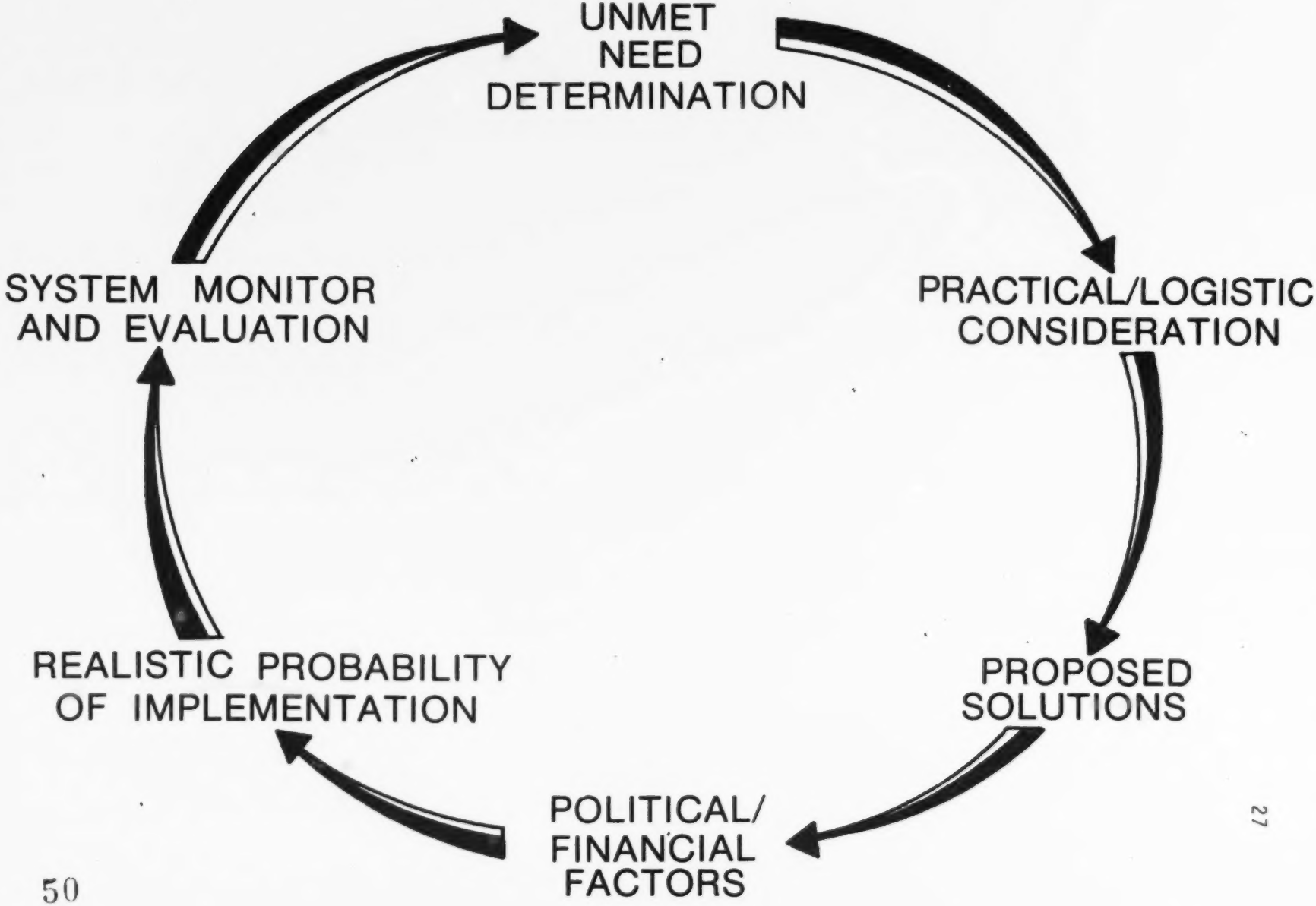
The broker can use this equation after the relationship between the variables has been quantified. Such tools can help in determining the potential for the development of transportation services.

The necessity for brokers to understand the needs of the community is crucial at all stages of development and implementation. The enlistment of task forces or advisory committees composed of different leaders of community groups has become a common practice of brokers. Through the active participation of the members of the community, the transportation broker can more effectively plan services and appropriate marketing strategies.

Summary

The planning, design, and implementation of a brokerage operation is done in direct response to specified needs and preferences of potential users. Planning techniques such as market segmentation are used to help determine the location of needs for transportation service as well as to provide direction for the selection of appropriate services. The simplified model provided in Illustration 4 shows the process of transportation brokerage planning.

Illustration 4. Transportation Planning Process.



STUDENT REVIEW AND INVESTIGATION

1. Discuss the role of the transportation broker. What is a broker? What are the goals of transportation brokerage? Is it of value to society?

2. Discuss how the flexibility of brokerage can help with transportation distribution problems. Relate this to concepts of duplication and coordination.

3. Create a simple survey to determine the mobility needs of your community or a part of it.

4. Interview someone in your community who rideshares. Discuss the benefits and problems including how the group deals with money, smoking, the radio, lateness, and unscheduled stops. Discuss with the class.

5. Discuss why market segmentation analysis is performed.

GUIDELINES FOR STUDENT REVIEW

1. Refer to pages 1 and 2 and class opinions..

2. Refer to pages 5, 6, and 7.

3. Refer to Figure 3 on page 23 and modify it to fit the local situation.

5. It is performed to assess where new or modified services are needed and where they would be feasibile to implement. In other words, market segmentation analysis matches transportation needs with existing and potential services.

OBTAINING SUPPORT FOR BROKERAGE

The purposes of this section are:

- To describe the importance of obtaining community support.
- To familiarize the student with the various federal agencies and offices available for obtaining financial support.
- To describe the channels through which funding is available for integrated transportation systems.

The Community Base

Obtaining community support is the main responsibility of the broker. Communication with the

- community-user groups,
- local politicians,
- existing transportation systems operators and employers, and
- social service agencies

is crucial to the success of any brokerage operation. The transportation broker should also attempt to gain the support of local professional firms and individuals who can

provide service in the areas of legal representation, accounting, public opinion research, and marketing.

A relationship such as this can be of benefit to the broker in both terms of savings on the cost of outside services as well as in local advocacy of the goals of the program. A strong community base in invaluable when developing innovative transportation operations.

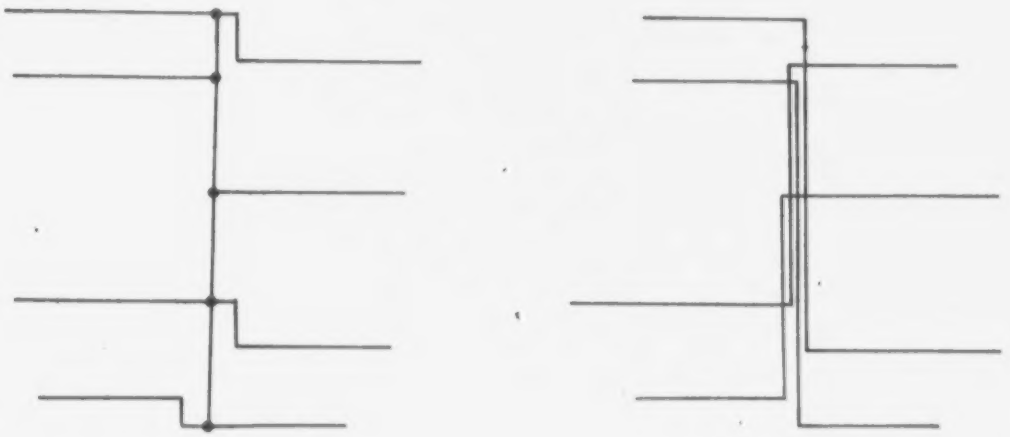
Planning and implementing any transportatijon service that is truly responsive to the transportation needs of a community, and is supported by the community, means involving group representatives from the beginning and throughout the life of the program. Too often services have been planned and put into place without involvement of the users at the planning stage. These services usually failed in an attempt to meet the transportation needs of the community and, thus, failed to survive.

An example of failure to include community members in the planning state is the Miami Beach project. In 1979, it was proposed that a switch be made from the present bus system which provided overlapping service, to a more efficient corridor-based routing system. The new system was based on frequent express service along the corridor with transfers to local feeder routes. A schematic comparison of the two systems is shown in Figure 5.

Figure 5: Miami Beach Project - Simplified Bus Routes

Simulation of Miami Beach Network

Experimental, More "Efficient" System



This plan was developed for its theoretical efficiency, without consulting the predominantly elderly ridership about their needs. After implementation of the express line attracted few riders, planners began to meet with the elderly. This group expressed their need for direct service with no transfers, rather than a faster, more frequent service requiring a transfer. Had the planners used a market segmentatijon needs-based approach, they might have recognized that Miami Beach was not a good location for this experiment.

The brokerage process should always be based on the realization that integrated services are a means to an end and not an end in themselves. It has been found in many demonstration projects that key elements in marketing the system to the public include: a pass program, fare structures, extensive marketing, and public information services. The use of marketing tools, throughout the life of the program, is essential in creating public awareness and assuring a favorable public response.

Contractual professional support from an advertising firm which can graphically promote and explain the system can exert a positive influence on public attitudes. In addition, even existing systems need strong local support to secure ongoing funding.

Obtaining Financial Support

Each year the U.S. Department of Transportation (DOT) spends billions of dollars of which one billion dollars is designated for urban public transportation operations. U.S. DOT funds are made available in several ways. The first type is formula matching grants in which the amount is predetermined for each state and metropolitan area and must be matched by local funds. Second are discretionary matching grants which are allocated based on UMTA review of individual applications. These grants require matching

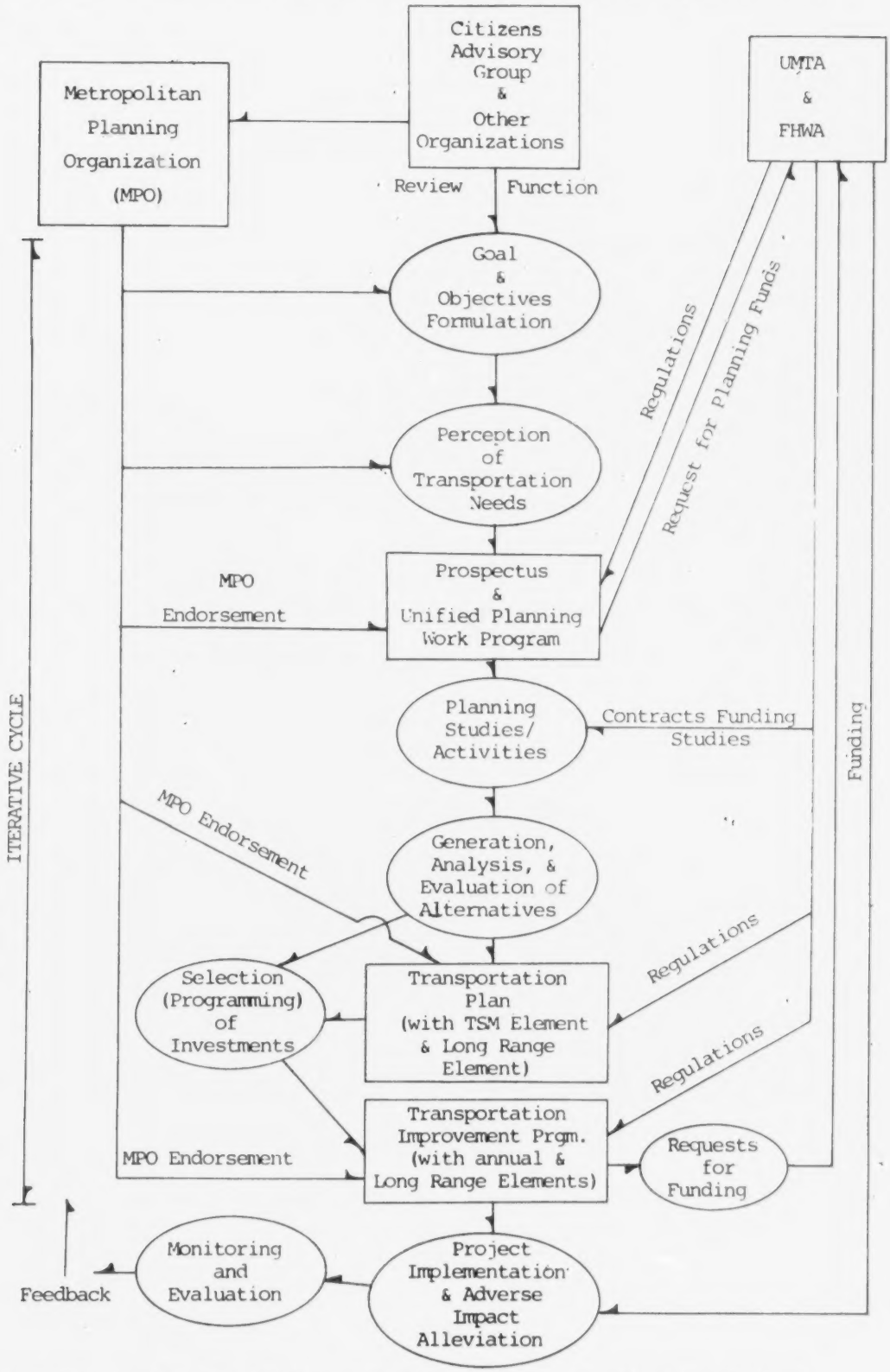
funds. Third are discretionary demonstration project grants which are fewer in number but have the advantage of requiring little or no local matching funding.

An overview of the urban transportation planning process is presented in Figure 6. In the Figure 6 flow chart, squares indicate organizations or groups, ovals indicate actions or tasks, and rectangles indicate products such as documents.

In 1975 regulations were issued jointly by UMTA and the Federal Highway Administration (FHWA) to establish a regulatory basis for the consideration of highway and transit together. These regulations provide that the governor of each state designate a Metropolitan Planning Organization (MPO) for each urbanized area in the state. The MPO is intended to be the forum for cooperative decision-making by making principal elected officials of local governments who are required to have representation on the MPO.

The MPO is responsible for coordinating the preparation of certain informational materials to assure eligibility for federal assistance. The federal "certification process," in which this documentation is reviewed as a precondition to federal assistance, serves to ensure that the region seeking funding has fulfilled certain process-oriented requirements. These requirements apply to all urban areas seeking FHWA or UMTA assistance.

Figure 6. Role of MPO's in the Urban Planning Process. 35



SOURCE: Taxis, The Public & Paratransit: A Coordination Primer, 1978, p. 78.

The major influence of the MPO comes from its control over federal aid. Funding is divided by purpose, such as funds for planning versus funds for operation and maintenance.

As a result of various moves toward more local participation in the transportation planning process, the state's role consists of the following:

- The governor designates the body that will be the MPO, thus controlling the incoming federal aid.

- The state allocates planning funds:
  Highway Planning and Research (HR&R) funds go directly to state transportation agencies for statewide highway planning and metropolitan transportation planning.

  Metropolitan Planning (MPL) funds are allocated to a state on the basis on the ratio of the population of urban aras in that state to the total urban population in all states. It is then up to the state to determine a formula by which its allocations is divided among local MPOs.

Any new service in a metropolitan area must be considered by the MPO and a number of other public political approval and funding processes. Without strong and dedicated public support, even the most needed service will not come into existence.

Summary

It is the transportation broker's responsibility to understand the federal and local political and regulatory systems. Federal funding is available for the planning and operation of integrated transportation systems. The person acting in the role of broker must employ the correct methods to procure funds in accordance with the type of program to be implemented and the requirements of the funding organizations.

PLANNING FOR BROKERAGE

The purposes of this section are:

- To familiarize the student with types of brokerage operations.
- To describe the basic options available when planning for specific system needs.

There are a wide range of institutional frameworks around which specified transportation services can be arranged and provided. Transportation brokerage is suitable as a flexible management structure especially for the purpose of matching transportation needs with transportation services. The broker may be contracted to provide the matching service by the public sector or the private sector.

Brokerage Sponsors

Public Sectior

- Local governments
- Regional transit authorities, providing service for groups of communities or for several states

Private Sector

- Non-profit social service organizations
- Profit-making, nonsubsidized organizations
- Profit-making transportation organizations that have local government contracts and subsidies
- Employer and employee organizations

Modal Options

In meeting the transportation needs of a community, the broker may use any combination of the four major modes of transportation which are shown in Illustrations 5a, 5b, 5c, 5d, and 5e.

Fixed-Route

Traditional transit service such as bus and light rail provides transportation for public use. The broker, for example, may determine that a particular subdivision of a major city is not receiving adequate service. Minibuses may be used in the area to provide feeder service to the existing lines.

Pre-Arranged Ridesharing

Many human service agencies and private corporations have provided transportation brokerage operations for clients and empoloyers. Van, car, and buspools can efficiently meet this need.

Illustration 5a. Transit and Paratransit Modes.

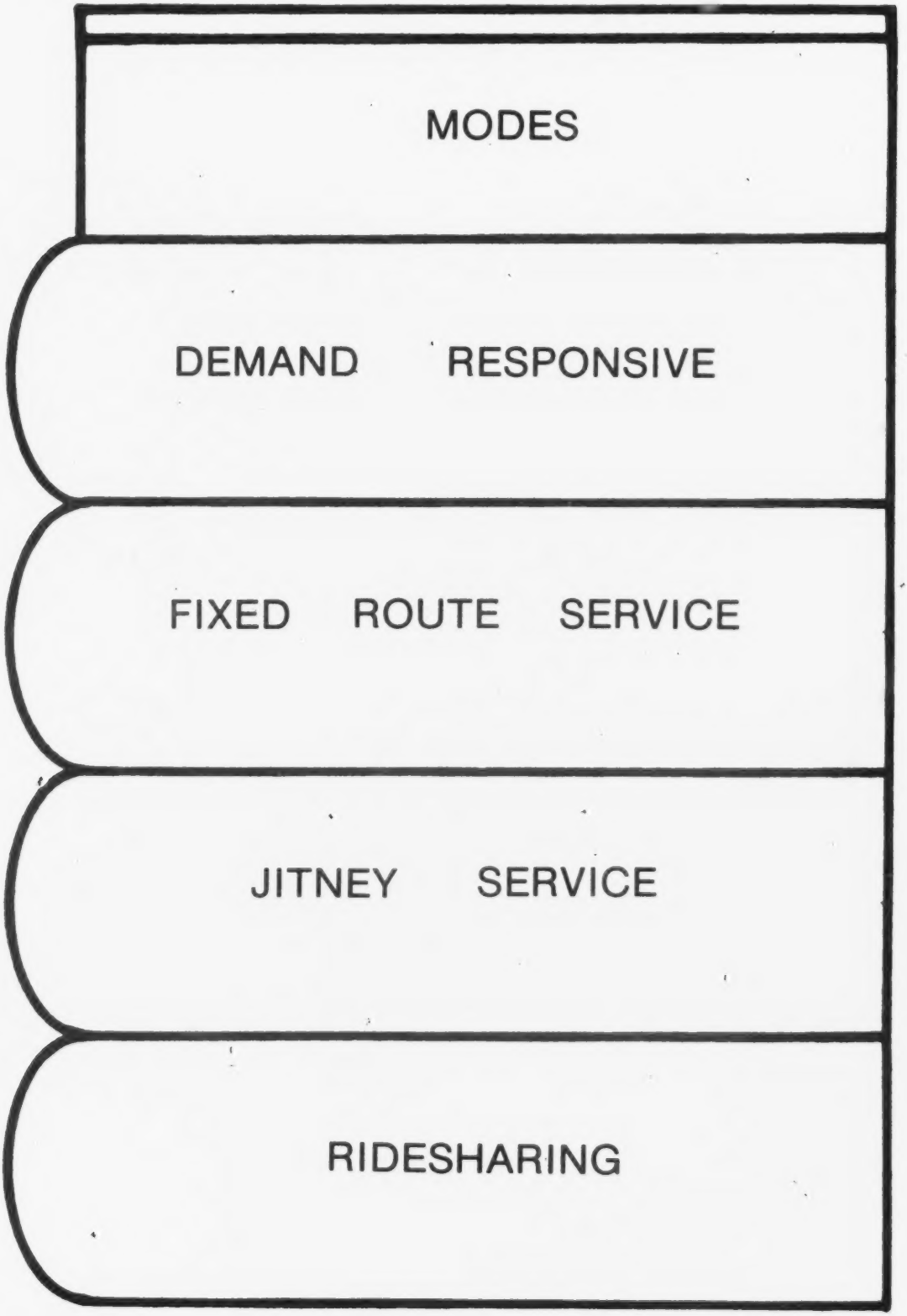


Illustration 5b. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
DEMAND RESPONSIVE	MEETS INDIVIDUAL SERVICE NEEDS	TAXI SERVICE
	DOOR TO DOOR SERVICE	DIAL-A-RIDE
	SERVICE TO ELDERLY & HANDICAPPED	SPECIAL PURPOSE VANS

Illustration 5c. Transit and Paratransit Modes (cont'd).

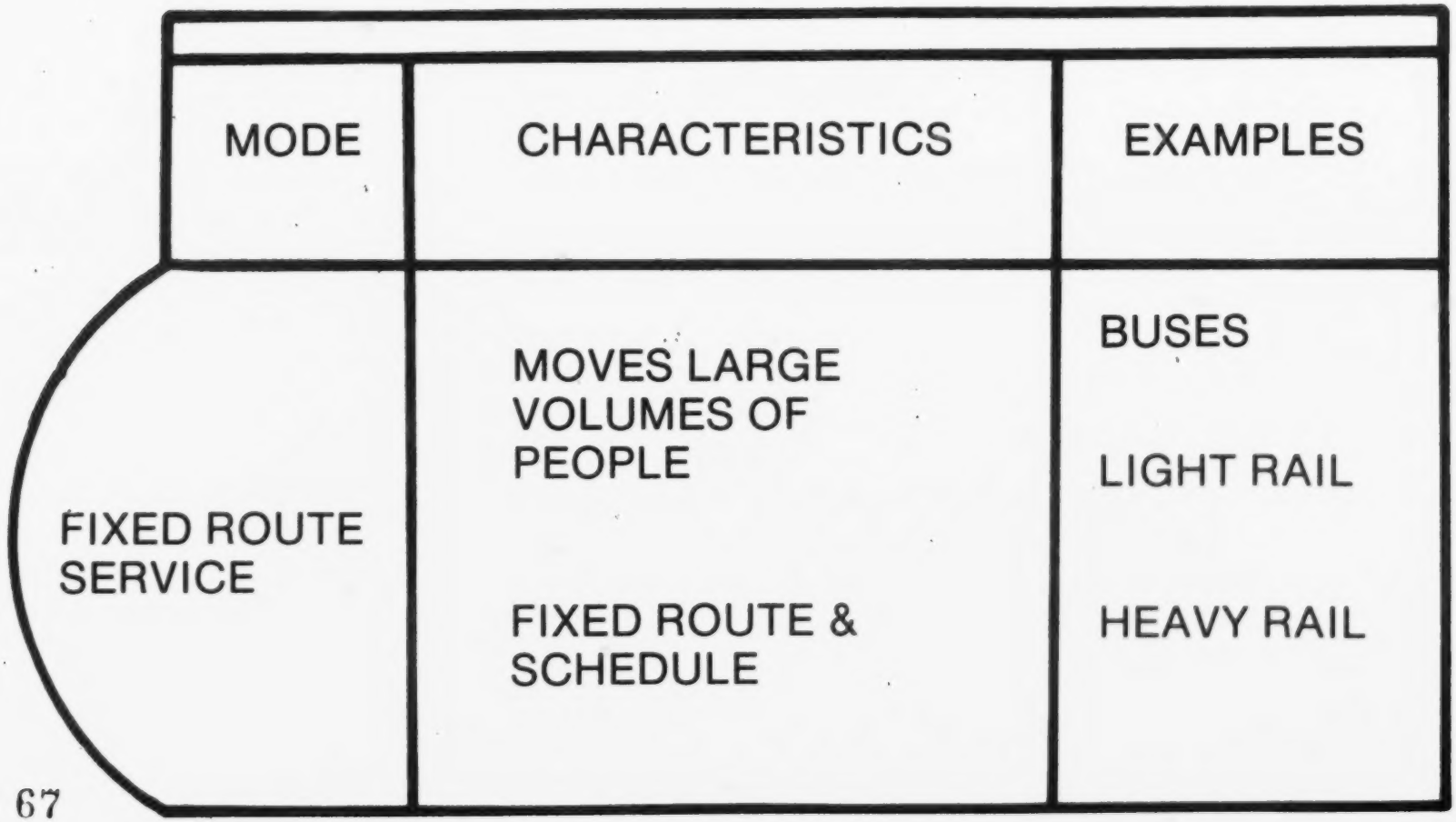


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Illustration 5d. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
JITNEY SERVICE	VARIABLE SCHEDULE FIXED ROUTES PERSONAL STOPS ALONG ROUTE	MINI BUSES STATION WAGONS VANS

Illustration 5e. Transit and Paratransit Modes (cont'd).

MODE	CHARACTERISTICS	EXAMPLES
RIDESHARING	COMMUTER ORIENTATION LOW COST/QUICK RESULTS THIRD PARTY SPONSORS	CARPOOLS VANPOOLS SUBSCRIPTION BUS

Demand-Responsive

The use of demand-responsive service can be effective in meeting flexible transportation needs of various market segments. For example, Dial-A-Ride can provide door-to-door, personalized transportation on demand, on a shared-ride basis, to the transportation disadvantaged.

Jitney

Jitneys operate on more or less fixed routes but without a fixed schedule. They also may deviate from the route to assist riders. Jitneys are common in developing countries from Mombasa, Kenya where they serve all outlying areas to Bangkok, Thailand where private jitneys compete directly with the public bus system on the same routes.

Vehicle Provision

The transportation broker often best service transportation needs by avoiding costly and time-consuming tasks such as vehicle ownership and maintenance. Just as the typical freight broker does not maintain a fleet of trucks, airplanes, ships, and trains, the transportation broker need not maintain buses and automobiles.

In coordinating a transportation service, the provision of vehicles is frequently accomplished through contractual arrangements with operating companies. The following example describes how a broker coordinates such a service.

ACCESS is door-to-door, advance reservation, shared ride transportatijon system for elderly and handicapped people in Allegheny County, Pennsylvania. The Port Authority of Allegheny County (PAT) hired a broker, ACCESS Transportation Systems, Inc., to organize and manage service delivery, and to coordinate the demands of individuals and agencies for this service. ACCESS was designed to provide an alternative means of transportation to persons who are not physically able to use the fixed-route PAT transit service.

ACCESS transportation services are provided through the use of vehicles operated by private carriers, including taxi companies and non-profit agencies, under contract to ACCESS Transportation Systems, Inc. These carriers, of which there are now eleven, are responsible to the broker for providing service and meeting the service standards or specifications in their ACCESS contracts. The broker, in turn, pays for service delivered on the basis of a negotiated hourly rate or on the basis of the entered fare.

Since its inception, the ACCESS system has profited from the support of Allegheny County's elderly and handicapped community. With their continued input of ideas and suggestions for system improvements, ACCESS should continue to adapt to the needs of the persons it was designed to serve.

Three major advantages to non-ownership of vehicles by the broker are described below:

- lower initital capital cost is necessary,
- alternative suppliers can be used in the case where a carrier cannot perform the contracted transportation function,
- serving clients, not maintaining vehicles, can be the sole priority of the brokerage management.

Brokered demand-responsive systems such as ACCESS are becoming more common in the United States though few are as comprehensive as ACCESS and few benefit from the secure funding base provided by dedicated Pennsylvania lottery profits for the elderly.

Planning for Specific System Needs

All types of brokerage operations have the same main functions--planning, public relations, and operations. Specific concerns will differ between systems. However, demand-responsive transportation (DRT), ridesharing programs, and integrated operations are characteristically different in respect to strategic planning.

The size and type of brokerage operation will dictate the necessary management organization. Large integrated transportatijon systems, in particular, require complex management structures for adequate communication and effective operation. For example, demand responsive

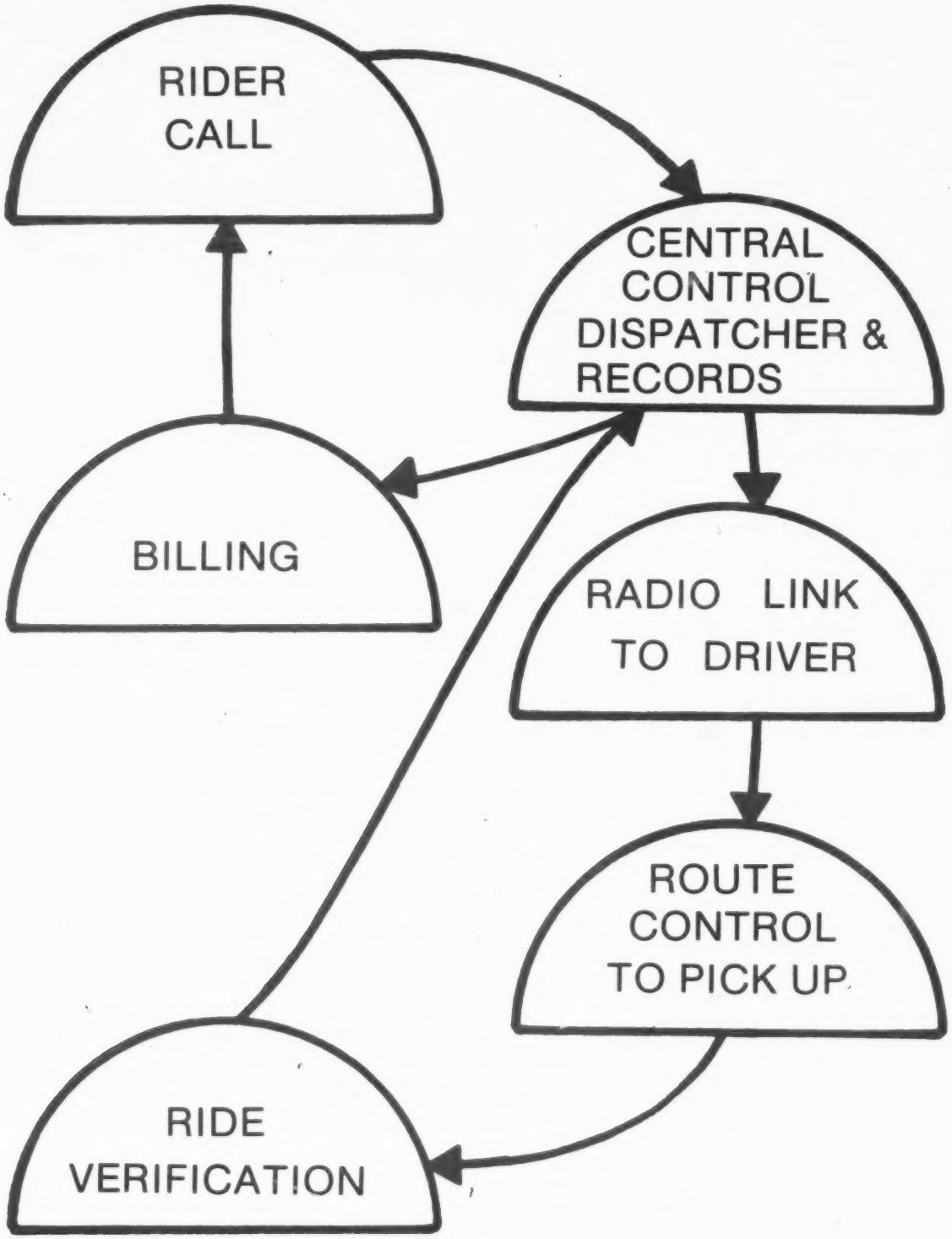
service has inherently complex information needs. Illustration 6 depicts the necessary communication sequence for each rider. In addition to this information management, human service agency invoices must be prepared, user fees collected, and statistical reports generated.

Data Management

Computerized Management Information Systems (MIS) have been used by transportation brokers to provide faster, more efficient, and more reliable service for riders. For example, the Cape Cod Regional Transit Authority (CCRTA) implemented a computerized MIS to meet the operational and administrative needs of its demand-responsive bus service. Some conclusions from CCRTA's experience are provided below.

- Reasonably priced computers are available that can meet the information needs of demand-responsive services at a reasonable cost.
- Some prepackaged software is available or custom software can be written.
- A computerized MIS can help make implementation of complex new services feasible.
- It is necessary to evaluate the suitability of using MIS under various constraints such as size and type of operation.

Illustration 6. Communication Pattern for Demand-Responsive System.



The adoption of a computerized data management system must be carefully considered in relation to the size of the transportation operation and the level of demand for managing its information. For example, some implications derived from the Rochester, New York, Integrated Transit Demonstration are briefly outlined below:

- Dispatching fewer than eight vehicles in a Dial-A-Ride Bus operation can be effectively performed by a single highly-skilled dispatcher.

- The high initial cost and inevitable phase-in problems of computerization of an existing system usually outweigh its potential benefits.

- The success of large systems often depends on effective computerization, unless isolated service areas can be created with each handled by a single dispatcher.

UMTA has supported research in the early 1980s to develop, test, and improve computerized information systems for public transportation systems. Currently, they provide computer programs in the public domain and information on available commercial software.

Summary

Many factors such as the type and size of the brokerage operation, determine its specific functions. A careful analysis of the requirements for efficient operation define system parameters. Decisions on employing computerized data management and on owning vehicles are critical when planning transportation brokerage.

BARRIERS TO BROKERAGE

The purposes of this section are:

- To familiarize the student with the major barriers to innovative transportation systems.
- To illustrate efforts to deal with these barriers.

A thorough understanding of the diverse groups and institutions which make up the urban environment is required of urban transportation planners. Planning an optimal transportatijon system is not enough to ensure implementation. Implementation brings change, and change frequently brings opposition.

When viewed in the context of the history of transportation, resistance to change may seem inevitable. Franchise rights and right-of-way privileges for private carriers were designed to protect investments, and public transit workers' unions were formed to insure job rights. Any new action which might infringe on these institutions may be opposed--in some cases by law.

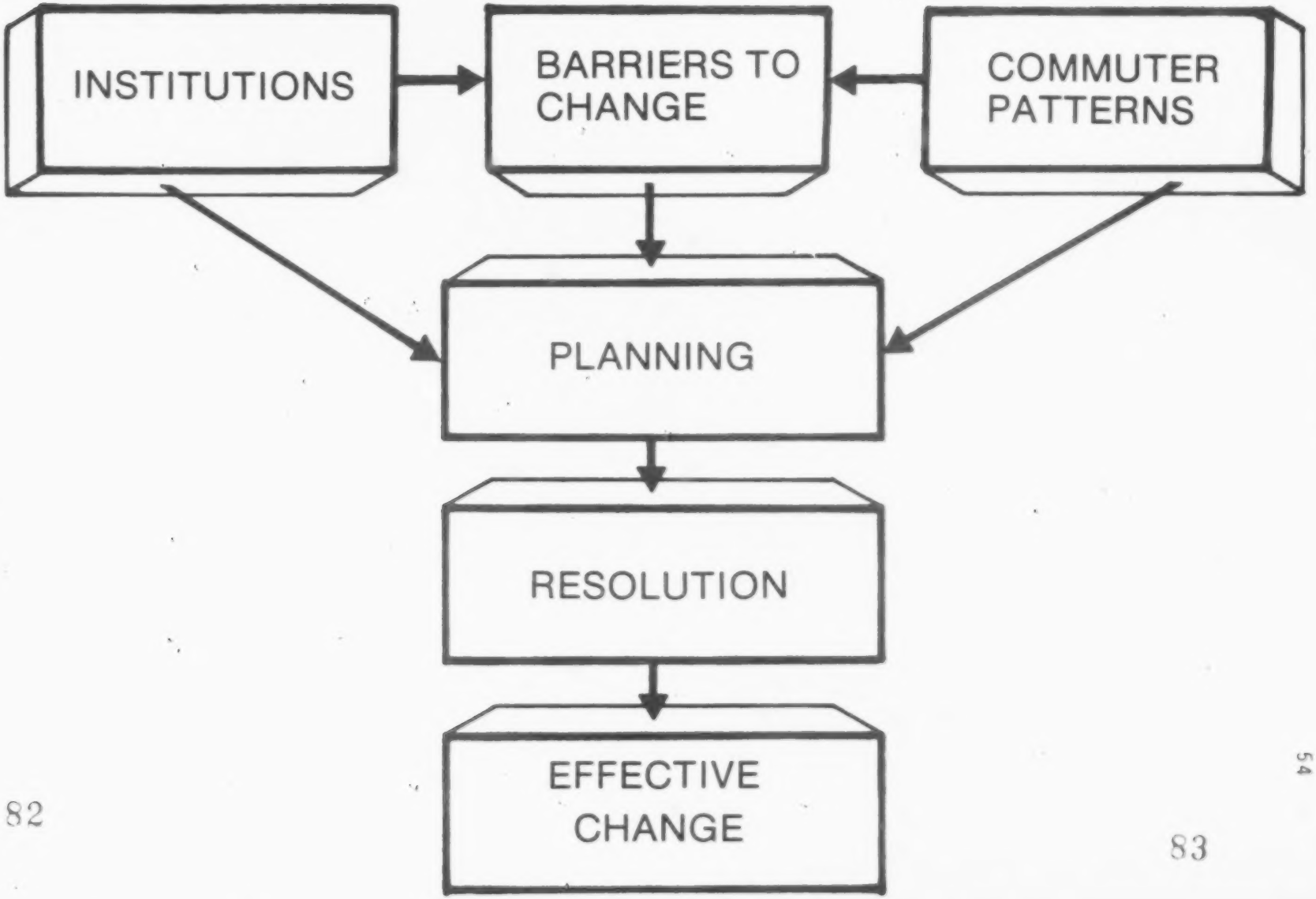
Brokerage operations often include a subsidized paratransit service such as dial-a-ride, special-use taxi, or ridesharing. These types of services may initially appear as competition to existing services since brokers can design systems which cross jurisdictional boundaries.

However, inclusion of private carriers as transportation providers in integrated brokerage operations can mean increased ridership. Private carriers may find that it is in their interest to participate in a subsidized paratransit service.

> A barrier is any obstacle which hinders the implementation of transportation systems. One of the broker's key roles is to identify and resolve these barriers through transportation planning.

As Illustration 7 shows, effective change may be realized only after all barriers are resolved. It must be emphasized that <u>barriers and resolutions are determined according to individual regional characteristics and needs</u>. An awareness of these constraints gives brokers a base from which to begin.

Illustration 7. A Model for Effective Change.



What follows are some some of the common barriers that must be considered in the design process.

Political Barriers

Local political interests frequently support particular groups, systems, or neighborhoods. These interests can act as barriers to the innovative use of transportation services in other areas. Lack of commitment by political leaders can also impede brokerage efforts by creating barriers even after implementation of the transportation operation. For example, political opposition can arise from transportation initiatives which service certain user groups and not others.

Similarly, the distribution of services and of tax revenues throughout different jurisdictions has serious political implications. Since tax revenues play a major role in funding transportation, the issue of which jurisdictions will benefit from, and pay for, the increased service needs to be resolved.

Legislative Barriers

Transit worker unions, as mentioned earlier, must be consulted in accordance with the Urban Mass Transit Act of 1964. Section 13(c) of that act states that any new system which might adversely affect transit workers' jobs must include provisions to ensure that no worker be displaced.

The potential conflict between paratransit and conventional transit is greatest for two concepts: vanpooling and special market demand-responsive services. However, most metropolitan bus systems are overutilized during peak hours when vanpools operate so even a shift of some riders from transit to vanpools would not negatively affect transit in these regions. Likewise, some conflicts between demand-responsive sevices and transit have occurred but Dial-A-Ride systems are usually targeted to people who are unable to use conventional transit.

Jurisdictional Barriers

Private carrier groups, such as taxis and buses, own franchise rights to certain jurisdictions. Yet demand-responsive transportation and user-subsidy programs may require cross-jurisdictional service to be effective. The broker, in planning for the use of such services, must respect the rights of private carriers and convince them that their participation in the new service might actually increase ridership and will not harm existing franchises. For an example, the ACCESS system was delayed by a taxi company lawsuit and now the same company is one of the largest service operators in the ACCESS system.

Physical Barriers

The transportation handicapped and some senior citizens have special transportation needs. The broker, in

designing an operation, must recognize these needs as they relate to vehicle selection and local conditions. The following example illustrates this concept.

> In Pittsburgh, PA, the legal mandate to serve the handicapped was going to be met by the installation of wheelchair lifts on city buses. The federal government was requiring this costly project and was subsidizing it. However, this plan was resisted in Pittsburgh because its hilly geography made it difficult for handicapped people to get to bus stops. After serious political and legal efforts, the same funds were consequently put toward the adoption of the ACCESS door-to-door van and taxi service.

Attitudinal Barriers

In many cases, attitudinal barriers have proven to be the most difficult obstacle for transporttion brokerage. Transportation professionals acting as brokers must respect the attitudes of different groups in the community, such as the citizens, the transportation providers, the politicians, and the service users. Negative attitudes toward an operation can block efficient implementation. For example, traditional planners may interfere with brokerage planning as their traditional role has been to engineer new, large scale systems. Likewise, commuters may

feel that ridesharing would infringe on their personal freedom and mobility particularly if implemented in conjunction with traffic lanes restricted to High Occupancy Vehicles (with a minimum of 3 or 4 passengers per vehicle).

Legal Barriers

The broker's attempts to help solve transportation distribution problems are sometimes blocked by the interpretation of existing laws. For example, the use of high-occupancy vehicles such as vans revealed insurance barriers. In many states, vanpools were classed by law in the same high risk insurance category as buses. This was necessary as virtually no experience with vanpools was available for the prediction of risk.

Progress with insurance barriers has occurred throughout the country over the past decade. From the experience provided by government sponsored transportation projects, the insurance industry has been able to more accurately predict risk factors. Consequently, many states have reformed laws to permit a separate insurance rate category for vanpool operations.

Summary

Headway has been made in the resolution of political, attitudinal, and legal barriers. However, the future of innovative transportation service depend on continued efforts in this direction as well as constant attention to obtaining funding. The most effective way to resolve barriers on the local level and to obtain support for funding is through careful planning and community involvement at all stages of transportation development. Illustration 8 and Figure 7 illustrate many of the community groups which should be included in decision-making.

Illustration 8. ___Principal Groups Involved in the Transportation Decision-Making Process.

Source: Technology Sharing, 1978, p. 29.

Figure 7. Principal Groups Involved in the Transportation Decision-Making Process.

GOVERNMENT	CITIZEN GROUPS	BUSINESS COMMUNITY
Local	Advisory Boards	Chamber of Commerce
County	Fraternal Organizations	Developers
Metropolitan	Howmowners	Labor Unions
Regional	Individuals	Merchants
Special District	League of Women Voters	Newspapers
Transportation Authority	Neighborhood Groups	Taxi Companies
State Department of Transportation	Parent Teacher Associations	Transit Operators
Other State A-95 Agencies	Peace Groups	
Federal Department of Transportation	Religious Groups	
Other Federal Agencies	School Groups	
Law Enforcement	Service Clubs	
Public Safety Agencies		
Welfare		
Health Agencies		

SOURCE: Technology Sharing, 1978, p. 29.

STUDENT REVIEW AND INVESTIGATION

1. Discuss the concept of obtaining community support as it relates to brokerage.
   What communication channels are used by the broker?
   How is community support related to financial support?

2. Investigate a real example from your area which illustrates how a transportation system is marketed to the community? Interview the person responsible for the marketing efforts and discuss the cost, targets, and intended effects of the promotional activity. Discuss with the class.

3. Describe a hypothetical MPO. Who might be included, and how might they influence decisions for fund dispersion.

4. Describe examples of three major modes of transportation in your area if they exist. Investigate whether these services are provided through directly or through brokered contractual agreements.

5. Review the various types of barriers to innovative transportation proposals and discuss how each might hinder the implementation of a user-side subsidy program for the elderly based on taxi rides. What steps could the broker take to avoid or deal with these obstacles? Discuss with the class.

GUIDELINES FOR STUDENT REVIEW

1. Refer to pages 28 and 29 and Figure 7, on page 61.

3. Refer to pages 33 - 36..

4. See Illustration 5, pages 40-44 and adapt it to the local situation..

5. Refer to each barrier discussed in pages 55-58 and discuss how it relates to the proposed system.

IMPLEMENTATION OF BROKERAGE

The purposes of this section are:

- To familiarize the student with the complexities of implementing a brokerage operation.
- To describe the general characteristics of transportation contracts.

Once a brokerage operation has been designed, the broker will be concerned with the implementation, management, and evaluation of operations. After system funding and design are completed, the tasks involved in brokerage are to:

- negotiate contracts with service providers;
- provide orientation for service providers;
- hire and orient brokerage staff;
- formalize service arrangements; and
- pretest the operation.

Personnel

Staffing requirements for a brokerage operation may include control center staff (scheduler, dispatchers, and telephone-call handlers), support staff (bookkeepers,

clerks, and marketing personnel), and management staff. Depending on the nature of the operation, some of these functions can be combined or contracted out.

To the user of a transportation system, the people who operate the service are the system. The drivers and employees are the public's main contact with the system and are crucial to its success. For example, an indifferent driver may lose more riders than an aggressive promotional campaign can attract. Similarly, any driver for a group of people, such as a carpool, must be aware of his or her role in the overall system.

To ensure efficient operations, regardless of the size of the system, a sound orientation program is necessary. For instance, many new demand-responsive systems have a training period of several week to acquaint employees with their specific duties and with the system as a whole. A driver's sensitivity to and knowledge of passenger's needs will decrease the chance of injury as well as diminish rider's uncertainities. The broker must be aware that education of this sort takes time. For example, in Ann Arbor, Michigan, it was estimated that dispatchers and schedulers took from four to five months to become proficient in performing their duties. New drivers in the same system took six to seven months before coming fully prepared to perform their duties.

The case below illustrates how one brokerage operation increased the driver's sensitivities to the rider's special needs.

> The ACCESS transportation services of Allegheny County put heavy emphasis on understanding the nature of handicapped consumers' disabilities and on sensitivity training. Drivers were "handicapped" with blindfolds, crutches, and/or wheelchairs, and were often asked to negotiate an obstacle course, to go out on a downtown street, and to board and ride a van. Many drivers commented very favorably on this course, regardless of the number of years experience they had had in driving for the handicapped.

The ACCESS system has been successful in providing the community with transportation services. This success is partly due to the human interface the drivers provide between the transportation system and its users. As mentioned earlier, dedicated funding from the Pennsylvania lottery is another factor in the success of this ambitious and comprehensive system.

Negotiating Contracts

Establishing formal contracts for the provision of transportation services is a main part of the role of the broker. Transportation providers, public agencies, and potential users are among those involved in brokerage

through contractual relationships. The complex, time-consuming negotiation process is critical to all involved. For instance, it is important to the transportation provider because it specifies both the potential risks and potential returns for participation in the project. For the broker, the contract is a tool through which both the economic and the service quality objectives are met, as well as a means of reflecting necessary concerns regarding public safety.

One of the most crucial aspects of any transportation contract which involves subsidies is the specific arrangement for compensation. There are several basic forms of compensation which include numerous specific possibilities. Each form carries certain advantages and disadvantages. These general types of reimbursement agreements are described in Figure 8.

Pretesting the System

Taking the necessary time to assess operational readiness before actually implementing service is essential. Pretesting a system gives the broker a chance to work out difficulties in advance. Depending on the particular transportation service, methods of pretesting can range from simulations on paper or computer to extensive trial runs. In most cases, a trial run which services a sample user group tests the system more

Figure 8. Comparison of Contract Types

FORM OF CONTRACT	RISK FACTOR	DISADVANTAGES	ADVANTAGES
Fixed Price	High to all involved, particularly carriers (contract must be executed with minimums and maximums)	Strong disincentive to deliver high quality service since carrier's costs rise proportionately to service rendered	Simplifies agencies budgeting and bookkeeping
Cost Plus Fixed Fee	No risk to carrier since all costs are covered by agency	More bookkeeping effort to monitor service quality, costs, and productivity	Agencies may trade off cost and service quality as desired
Fixed Unit Cost	Low risk even though carriers estimate only standard, not actual costs on a unit basis (such as miles or passengers)	No incentive for carrier to provide high quality service when payment is based on quantity of service units	Carrier may be paid appropriately for the quality of service delivered when the cost units (such as per vehicle hour) are the basis for payment
Direct User Subsidy	Risk is low for all involved	Carrier must be sure that the period for settling bills received is satisfactory and the carrier's cooperation is required for the special method of payment	Users receiving subsidies can be specifically targeted and the level of subsidy to each user can be defined individually

effectively than a simulation. For example, in pretesting a demand-responsive service, trial runs can be made with staff members role-playing riders. Careful notes can be taken on service quality and an analysis can be performed to identify possible system improvements.

Summary

Many factors exist that can affect the smooth implementation of the brokerage operation. The person acting as a broker needs sensitive insight and meticulous planning to successfully negotiate appropriate contracts, hire and orient personnel, and pretest the system. Each phase must be successfully completed before the brokered service can actually begin to operate.

MANAGING A DYNAMIC SYSTEM

The purposes of this section are:

- To familiarize the student with the process of managing a brokerage operation.
- To describe how a broker uses evaluation and promotion to maintain a high efficiency level for the system.

In order to maintain an operation which is current with the changing demands of the community, continuous monitoring and evaluation is required. Efficient record keeping and evaluation procedures are essential for the purpose of measuring system performance. Additionally, a successful marketing program can be a key to attracting and holding riders.

Marketing Program

A good marketing program not only offers and sells quality service, but also reflects the changing needs of the consumer. Because marketing both gives and receives information, it is a critical communication process. Market research determines who needs which types of

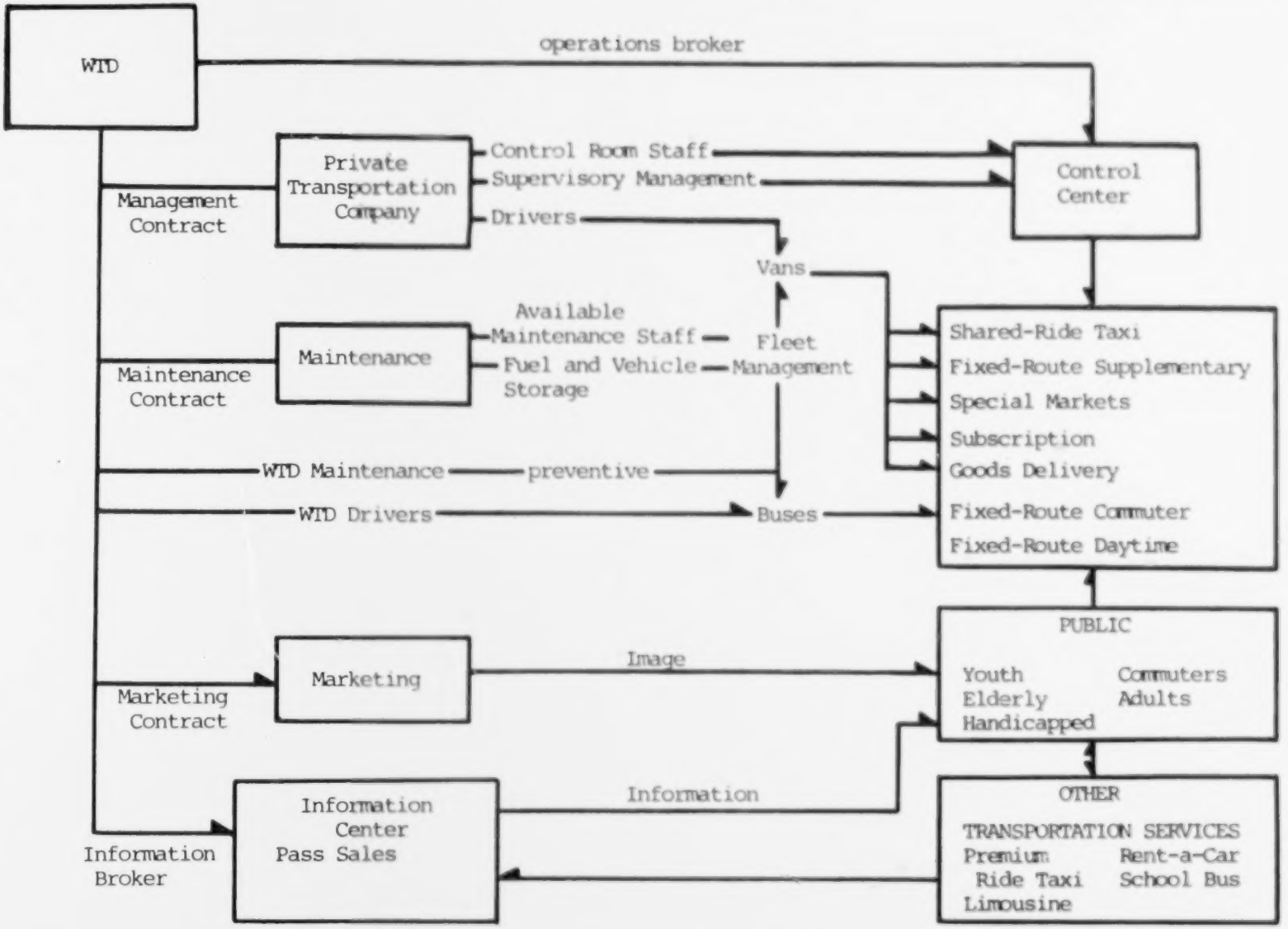
transportation services, and where and when they need it. Such data can help the broker in meeting these needs through system adaptions.

The marketing program must be coordinated with the operations program in order to maintain a transportation service that meets the needs of specific segments of the population. For example, in Westport, Connecticut, a dial-a-ride system was established and managed to transport commuters between their homes and the commuter rail station. Market research identified this demand and helped to determine an appropriate solution. Figure 9 on the following page illustrates both the importance of marketing in the Westport system and the organizational complexity of a multi-modal brokered transportation system.

Useful information can be provided by market research to determine how and when the system will be promoted. In managing a brokerage service, promotion can be done in the form of public information, customer relations, and advertising. The user of items such as logos and distinctive color schemes has proven effective in promoting a system.

Management must provide clear information to the riders, particularly in the case where changes are made in the system. For example, if a broker determines that the people in a particular section of town are not receiving adequate peak time transportation, an extra bus might be

Figure 9. Structure of Westport Demonstration Plan.



SOURCE: Furniss, Robert E., The Westport Connecticut Integrated Transit System, 1979.

assigned to that area during that time. Radio and television announcements could be used to inform people of the change, as well as signs on buses, printed handouts, and news releases. An example of a promotional brochure is provided in Figure 10. The Share-A-Ride program promoted and coordinated services at selected employment sites in the Minneapolis-St. Paul area.

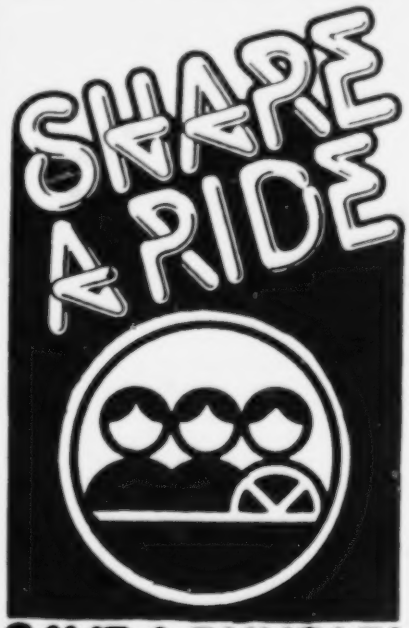
Evaluation

Measuring system performance is an ongoing process. Both qualitative and quantitative factors are assessed by transportation brokers in determining system performance and the resultant economics.

Market segmentation analysis provides the qualitative information such as riders' characteristics and preferences. Factors such as passenger/mile. cost/mile, and cost/passenger help to determine the economic efficiency of the system. Evaluation can help to:

- achieve cost-effective operations,
- assure that transportation services are meeting designated objectives, and
- ensure that unforseseen circumstances are identifed quickly so that changes can be made.
- provide evidence to the public and funding organizations that the system is efficiently providing needed services.

Figure 10. Sample Ridesharing Promotional Brochure.



SAVE A BUNDLE!

you can save
$575 a year
...just by changing
the way you
ride to work!

We're "Share a Ride", and the $575 is approximately what you can save if you don't drive your own car to work alone everyday.

Now, before you go stiff in your chair over the thought of not having your very own car sitting out there in the Company parking lot all day everyday, consider some of the advantages of sharing a ride to work.

You're going to save a lot of money... real, spendable, tax free income just because not driving will cost you less.

Depending on the car you're driving, you may save a little more or a little less than our $575. If you're driving a '39 Volks powered by a rubber band, chances are you've beat the system. If you're tooling to work in a '78 Mercedes 450 SEL, we're about to save you a bundle.

Most days you'll be driven to work, and that's easier on you. Parking gets easier because there are fewer cars on the lot.

If you're a one car household, leaving the car at home will help others in your family get around.

And Share a Ride is a neat way to meet some new folks.

There are three ways to "Share a Ride". Which one interests you most?

CAR POOLING

We do all the work... supply you with the names, addresses and phone numbers of people in your area going to the same work location. We'll even suggest how you split the expenses. All you folks do is get together. And, it's flexible... you don't have to ride everyday. Plus the fact that car pooling may qualify you for a discount on your auto insurance.

VAN POOLING

This is different, but so are the benefits. You could wind up driving a nifty Dodge or Plymouth Van for free. Use it for your personal needs, too. How about that!! Or, at the very least, you wind up being chauffered to work in style & comfort... with time to read the morning paper. Once again, we do all the work, and all the organization... all you have to do to get started is indicate your interest.

REGULAR BUSES

We provide the schedules, pick out the best route for you to ride, and sell you the MTC "All you can ride" monthly pass. You just climb aboard, and start saving that $575.

Source: Evaluation of the Minneapolis Ridesharing Commuter Services Demonstration, 1980, p. A-3

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Summary

The management is responsible for providing the best possible service under the policies and objectives established for the brokerage operation. This is accomplished through ongoing evaluation and promotion of the system. Data for service measurement are collected so that the performance of the transportation brokerage operation can be assessed and changes made to improve service quality and marketing.

OVERALL SUMMARY OF BROKERAGE MODULE

The purposes of this section are:

- To summarize the major considerations of transportation brokerage.
- To restate the rationale for using a needs-based consumer orientation in planning and managing integrated public transportation systems.

Brokerage is a management structure. The transportation professional, in assuming the role of broker, matches resources with needs through the medium of contracts or sales, without directly providing services. The transportation broker serves as:

- A clearinghouse for users of transportation and providers of transportation services.
- a resource-manager concerned with cost-effective and convenient service for the public, and
- an advocate for change of current legal and institutional barriers in order to provide better transportation.

Many cities have found their single-system transit unable to fulfill every individual's mobility needs. In an attempt to increase local transit options, transportation brokerage operations were created in many areas with financial support from the government. The brokerage concept has a consumer orientation which makes it flexible to many transportation needs. The broker specializes in recognizing the needs of the community and in helping to provide access to appropriate services so that consumers have a choice of transportation means.

The basic transportation problem is not a shortage of transportation capacity, but rather a problem of the distribution of this capacity. Public transit vehicles are only 1% of the vehicles on the road. Consequently, it is important for transportation planners to consider the other 99% of the vehicles as options for the provision of transportation services.

The broker, acting as a middleperson between providers and users, can help provide solutions for the distribution of transportation. These solutions can be cost-effective, consumer-oriented, and specialized to meet individual needs.

There are many different types of brokerage operations. The broker can be organized under the sponsorship of a city, a regional authority, a state

department of transportation, or even a private corporation. The type of sponsorship will naturally influence the brokerage operation's area of concentration.

Before the transportation broker can begin planning and arranging services, a great deal of information must be gathered and analyzed. This planning process is required in order to gain the data by which new systems or modifications of existing ones can be designed, implemented, and evaluated. System planning is generally broken down into the following four steps:

1. market segmentation analysis,
2. assessment of existing services,
3. analysis of unmet needs, and
4. targeted design.

Federal funding is available for the planning and operation of integrated transportation systems. It is the transportation broker's responsibility to understand the federal and local political and regulatory systems. The broker must employ the correct method of procurement of such funds in accordance with the type of program to be implemented.

Community input throughout the program, but particularly at the planning stage, is critical for success. The broker must adopt methods to insure open and continuous communication to achieve this critical support.

In meeting the transportation needs of a community, the broker may use any combination of the major transportation modes such as fixed-route, pre-arranged ridesharing, and demand-responsive service. The broker often best serves transportation needs by avoiding costly and time-consuming tasks such as vehicle ownership and maintenance.

In planning for specific system needs, the size and type of brokerage operation will dictate the necessary management organization. For example, demand-responsive service has inherently complex information needs.

Planning an optimal transportation system is not enough to insure implementation. Implementation brings change, and change frequently brings opposition.

> A barrier is any obstacle which hinders the implementation of transportation systems. One of the broker's key roles is to identify and resolve these barriers through transportation planning.

It must be emphasized that barriers and resolutions are determined according to individual regional characteristics and needs. An awareness of these constants gives brokers a base from which to begin.

Progress has been made in the resolution of political, attitudinal, and legal barriers. However, the future of innovative transportation service depends on continued effort in this direction. The most effective way to resolve barriers on the local level is through careful planning and community involvement.

Once the operation has been designed, the broker will be concerned with the implementation, management, and evaluation of operations. After system funding and design are completed, the tasks involved in implementing brokerage are to:

- negotiate contracts with service providers;
- provide orientation for service providers;
- hire and orient brokerage staff;
- formalize service arrangements; and
- pretest the operation.

Awareness of the changing demands of the community requires the monitoring and evaluation of the operation. A successful marketiang program is the key to attracting and holding riders. Efficient record keeping and evaluation procedures are essential in measuring system performance. Effective marketing and good internal relations are also essential. Data for measurement criteria are collected continously so that the performance of the transportation brokerage operation can be reviewed and changes made to improve the service quality.

Future transportation professionals can gain much from the previous experiences of UMTA-funded demonstration projects. Brokers should carefully match goals, staffing, and funding based on a critical appraisal of what can be realistically accomplished in a given period of time and with available resources.

Transportation brokerage is an exciting management concept. Its flexibility renders it viable as an alternative to traditional transportation management. However, it is not the answer. Failures have occurred and will occur. Continued research and experimentation in the field of transportation planning and management is necessary for cost-effective provision of needed transportation services.

STUDENT REVIEW AND INVESTIGATION

1. Create a model of a hypothetical taxi and bus based user-subsidy program, and discuss the steps necessary for its implementation.

2. Role-play: The broker for the transit district in Hometown, USA, is attempting to negotiate contracts with private carriers in the area. Determine some of the problems that might arise and how they can be resolved. Discuss the type of contract which was chosen. How were its inherent disadvantages dealt with?

3. Discuss how an effective marketing or promotional campaign has influenced your transportation choices.

4. Give reasons why system evaluation is a critical process and discuss its relationship to planning, marketing, and operations.

GUIDELINES FOR STUDENT REVIEW

1. Discuss in the context of pages 64 - 69.

2. Use Figure 8 on page 68 as background for the roles.

4. See page 73.

SELECTED REFERENCE LIST FOR BROKERAGE

The following texts were of particular value in the preparation of this module. A comprehensive bibliography follows.

Barber, et al, 1982

Bowan, et al, 1977

Davis, et al, Final Report

Demetsky, et al, 1980

Fleishman, D., et al, 1982

Fleishman, D., et al, Paratransit in rural areas, 1982

Fleishman, Daniel, Mercer County

Furniss, 1979

Heaton, et al, 1983

Heaton, et al, 1979

Lave, 1979

Misch, et al, 1981

Multisystems, Inc., 1982

Multisystems, Inc., Paratransit for the work trip, 1982

Multisystems, Inc., 1978

Public Technology, Inc., 1980

Public Technology, Inc., Taxicabs, 1982

Technology Sharing, 1981

Transportation Research Board, et al, 1979

Wegmann, 1978

Weisbrod, 1980

APPENDIX A: BIBLIOGRAPHY

Abbreviations to be used in this bibliography:

DOT	Department of Transportation
FHA	Federal Highway Administration
NTIS	National Technical Information Service
OSMD	Office of Service and Method Demonstrations
TRB	Transportation Research Board
TRR	Transportation Research Record
TSC	Transportation System Center
UMTA	Urban Mass Transportation Administration

Abkowitz, M., Damm, D., Heaton, C., & Jacobson, J. (1982). Impacts and effectiveness of third party vanpooling. Washington, DC: UMTA/TSC.

APTA (1985). Transit fact book 1985. Washington, DC: American Public Transit Association.

Barb, C.E., & Cook, A.R. (1979). Technology transfer in paratransit: Five case studies. Washington, DC: National Academy of Sciences.

Barber, E.J., Wagner, D.W., Ellis, R.H., & Hallenbeck, M.E. (1982). The Newport News, Virginia, easy-ride transportation brokerage demonstration project. Washington, DC: DOT/UMTA.

Bautz, James A. Urban Microscale Planning for the 1980s. Paper Prepared for the Conference on Travel Analysis Methods for the 1980's, Easton, MD, Oct.. 3-7, 1982.

Beeson, J.D. (1978). Knoxville commuter pool: Annual report, 1977-78. Washington, DC: DOT/UMTA.

Boaz, M., & Harman, L.J. (1980). The human services transportation consortium of Greater Bridgeport. Bridgeport, CT: Human Services Transportation Consortium.

Borowski, R.H. (1979). Automobile diversion: A strategy for reducing traffic in sensitive areas. Washington, DC: National Academy of Science.

Burkhardt, C.E., Burker, W.G., Eisenberg, M.A., et al. Coordination and consolidation of agency transportation. Washington, DC: TRB.

Casey, R.F. (1981). The accessible fixed-route service experience. Washington, DC: UMTA/OSMD.

Cervero, R. Experiences with Time of Day Transit Pricing. Washington, DC: TRB.

Charles River Associates, Inc. (1984). ACCESS: Brokering Paratransit services to the elderly and handicapped in Allegheny County, PA. Washington, DC: Office of Management Research and Transit Services, UMTA.

Charles River Associates for Transportation Systems Center for UMTA, DOT. (1980). Innovation techniques and methods in the management and operation of public transportation services. Washington, DC: DOT/UMTA.

Cohen, H.S., Stowers, J.R., & Petersitia, M.P. (1978). Evaluating urban transportation system alternatives. Springfield: NTIS.

Conner, D.L. (1979). Findings of preliminary analysis of the Trenton, New Jersey off-peak, fare-free transit demonstrations. Washigton, DC: UMTA.

Cook, A.R. (1979). Paratransit resource guide. Washington, DC: DOT/UMTA/University Research & Training Division.

Cook, A.R., & Barb, C.E. (1980). Paratransit curriculum guide. Washington, DC: DOT/UMTA.

Cook, A.R., Barb, C.E., & University of Oklahoma. (1979). Paratransit case studies: Overview. Washington, DC: DOT/UMTA/University Research and Training Division.

Dare, C.E. (1981). Transportation energy contingency plans for rural areas and small communities. Washington, DC: DOT.

Davis, F.W., Beeson, J.D., & Wegmann, F.J. (1978). The Knoxville transportation brokerage project:Philosophy and institutional issues. Final Report. Knoxville.

Davis, Groff, & Steahr. (June 1981). The analysis of the potential for dynamic ridesharing in a low density area. Executive Summary. Connecticut: Connecticut Transportation Institute.

Demetsky, M.J., Hoel, L.A., et al. (May 1982). Decision procedures for paratrnsit market selection and service evaluation. Washington, DC: DOT/UMTA/University Research Divison.

Demetsky, M.J., & Lantz, K.E. (1980). Implementation planning of integrated trnsit services for a small urban and rural area. Washington, DC: DOT/UMTA/University Research and Training Division.

Dorosin, E., & Phillips, J. (1979). Share a fare: A user-side subsidy transportation program for elderly and handicapped persons in Kansas City, Missouri. Washington, DC; DOT/UMTA.

Ecosometrics, Inc. The sixth national conference on rural public transportation. Final report, Nov. 1983, No. DOT-I-83-52.

Ecoplan International and Multisystems, Inc. (1982). The European paratransit experience. Paratransit: Options for the Future. Washington, DC: DOT/UMTA/Office of Policy Research.

Fleishman, D. (no date). Mercer County, New Jersey, coordination/consolidation demonstration project. Washington, DC: UMTA/TSC.

Fleishman, D., & Flusberg, M. (1982). Paratransit for the work trip: Commuter ridesharing. Paratransit: Options for the Future. Washington, DC: DOT/UMTA/Office of Policy Research.

Fleishman, D., & Flusberg, M. (1982). Paratransit in rural areas: Paratransit: Options for the Future. Washington, DC: DOT/UMTA/Office of Policy Research.

Furniss, R.E. (1979). The Westport Connecticut integrated transit system. Washington, DC: DOT/UMTA.

Green, D., & Assoc., Inc. Use of volunteers in the transportation of elderly and handicapped persons. Final report, Jan. 1984, No. DOT-I-84-02.

Heaton, C., Abkowitz, M., Domm, D., & Jacobson, J. (March 1983). Impacts and effectivness of third party vanpooling: A snthesis and comarison of findings for four demonstration projects. Washington, DC: DOT/UMTA.

Heaton, C., Jacobson, J., & Poage. (April 1979). Comparison of organizational and operational aaspects of four vanpool demonstration projects. Cambridge, MA: DOT/Research and Special Programs Administration.

Hoel, L., Perle, E., Kansky, K., et al. (no date). Latent demand for urban transportation. Pittsburgh, PA: Transportation Research Institute of Carnegie-Mellon University.

Holoszyc, M. & Beach, B. F. Transit Fare Prepayment Innovations in Sacramento. Washington, DC: TRB.

Holoszyc, M., & Newman, D. (1980). Evaluation of the Rochester, New York community transit service demonstration. Executive Summary (Vol. I). Washington, DC: UMTA/TSC.

Homitz, Allen & Associates. (1981). Training course for personnel in areawide ridesharing agencies. Washington, DC: DOT/Federal Highway Administration.

Hood, T.C., & Geiss, L.S. (April 1982). The volunteer tranpsortation program:Some suggestions and cautions in the use of volunteers as drivers, escorts, and other transportation workers. Washington, DC: DOT.

Iskander, W.H., & Hage, N.M. (December 1981). Integration of AGT systems with other transportation modes. Final Report. Washington, DC: DOT/UMTA.

Kirby, Bhatt, Kemp, et al. (1974). Paratransit: Neglected options for urban mobility. Washington, DC: DOT/Urban Institute.

Kocur, G., & Louviere, J. (1979). An analysis of user cost and service trade-offs in transit and paratransit services. Washington, DC: UMTA/TSC.

Lave, R.E., & Holoszyc, M.A. (March 1979). The Rochester New York integrated transit demonstration. Executive Summary (Vol. I). Washington, DC: DOT/UMTA.

Lee, Tamahlow, & Mulinazzi. (April 1981). A public transportation needs study for low density areas in a five state region in the Midwest. Washington, DC: UMTA/Office ofPublic Research/University of Kansas.

Meyburg, A.H. (October 1975). Mass transit development for small urban areas: A case study - Tompkins County New York. Second Year Final Report. Washington, DC: DOT.

Misch, Margolin, Curry, et al. (December 1981). Guidelines for using vanpools and carpools as a TSM technique (National Cooperative Highway Research Program Report #241). Washington, DC: TRB.

Multisystems, Inc. (1984). Estimating Patronage for Community Transit Services. Washington, DC: Technology Sharing Program, UMTA-USDOT.

Multisystems, Inc. (January 1982). Paratransit for the work trip: Commuter ridesharing. Washington, DC: DOT/UMTA.

Multisystems, Inc. (August 1978). Taxis, the public and paratransit: A coordination primer. Cambridge, MA: Multisystems, Inc.

Nelson, D., Spano, M., & Skepetin, S. (1981). Fixed route accessible bus service in Connecticut: A case study. Washington, DC:DOT/UMTA.

Newman, D.A., Bebendorf, M. (1983). Integrated bicycles and transit in Santa Barbara, California. Washington, DC: DOT/UMTA.

Newman, D.A., Holoszyc, M. Evaluation of the Rochester, New York community transit service demonstration. Executive Summary (Vol. I). Washington, DC: DOT/UMTA.

Office of Assistant Secretary for Government and Public Affairs. (May 1979). How ridesharing can help your company. Washington, DC: DOT/Assistant Secretary for Government and Public Affairs.

Public Technology, Inc. (June 1979). Transit pricing techniques to improve productivity. Washington, DC: DOT/UMTA/OSMD.

Public Technology, Inc. (January 1980). Institutinal framework for integrated transportation planning. Washington, DC: DOT/UMTA/Urban Consortium for Technology Initiatives.

Public Technology, Inc. (January 1980). Neighborhood controls. Washington, DC: DOT/Urban Consortium for Technology Initatives.

Public Technology, Inc. (April 1980). Center city environment and transportation innovations in five European cities. Washington, DC: DOT/UMTA/Department of Housing and Urban Development.

Public Technology, Inc. (September 1980). Taxicabs as public transit. Washington, DC: DOT/Consortium for Technology Initiatives.

Rural America (July/Aug. 1983). Getting There: Making Rural Transportation Work.

Schmidtt, R., Weitman, J., Beimborn, E. (April 1982). Examination of methods for cordinatin of transportation planning activities. Washington, DC: DOT/UMTA.

Schneider, J.B. (September 1981). Transit and the polycentric city. Washington, DC: DOT/UMTA/University Research and Training Program.

School of Urban Sciences, University of Illinois at Chicago Circle. (January 1981). Moving people. Chicago: University of Illinois.

Smerk, G.M., & Gerty, R.B. (1980). Mass transit management: A handbook for small cities (2nd ed.) (Parts I, II, III, IV). Washington, DC: DOT/UMTA.

Sobel, K.L., Alschuler, D.M. (1980). Paratransit planning: Application of a systematic market-oriented planning and programming process (Transportation Research Record #778). Washington, DC: TRB/National Research Council.

Soot, S., Stenson, H., Esser, M., & Joyce, L. (1982). Cognitive aspects of transit use in areas of high and low travel density. Executive Summary. Washington, DC: DOT/UMTA.

Spear, B.D., et al. (December 1981). Service and methods demonstrations program report. Washington, DC: UMTA.

Stammer, Robert E. & Giangrande, R.V. Microcomputer operation: The Tennessee experience.

Stommes, Eileen S. (1985) The use of cooperatives for alternative rural passenger transportation: Report on a New York study. TRB Paper.

Studenmund, A.H. (1982). The appropriate measures of productivity and output for the evaluation of transit demonstration projects. Washington, DC: DOT/UMTA.

Suhribier, J.H., & Wagner, F.A. (April 1979). Vanpool research: State of the art review. Washington, DC: DOT/UMTA.

Teal, R.F., Goodhue, R.E., Rooney, S.B., & Mortazavi, K. (1982). Taxi-based public transportaion for the elderly and the handicapped (Transportation Research Record #863). Washington, DC:TRB.

Technology Sharing. (March 1981). Paratrnsit: State of the art review. Washington, DC: DOT.

Tennessee Valley Authority. (March 1980). Ridesharing vs. road building: The TVA experience. Washington, DC: DOT/UMTA.

Texas Transportation Institute, Texas A & M University. (January 1978). Instructors manual: Aleternatives for improving urban transportation - a management overview. Washington, DC: DOT.

Transportation Center of the University of Tennessee. Transportation brokerage for executive Management. Washington, DC: UMTA.

TRB. (1980). New directions in transportation education (Transportation Research Record #748). Washington, DC: National Academy of Sciences.

TRB. (1981). Ridesharing needs and requirements: The role of the private and public sectors. Washington, DC: DOT/UMTA.

TRB. (1981). Transportation education and training: Meeting the needs of the 1980s (Transportation Research Record #793). Washington, DC: National Academy of Sciences.

TRB. (1982). Paratransit planning and management (Tranportation Research Record #863). Washington, DC: National Academy of Sciences.

TRB. (1982). Ridesharing 1981. Washington, DC: National Academy of Sciences.

TSC. (March 1981). Paratransit: State of the art overview. Washington, DC: DOT/TSC.

TSC & UMTA. (1974). State of the art overview of demand-responsive transportation. Washington, DC: DOT/UMTA.

UMTA (Aug. 1984). A Manual for Planning and Implementing a Fare Change. Washington, DC: UMTA.

UMTA/DOT. (1980). Innovative techniques and methods in the management and operation of public transportation services. Washington, DC: DOT/UMTA.

UMTA/DOT. (September 1980). Rural transportation projects on Indian reservations: A report on eleven demonstrations. Washington, DC: DOT/UMTA.

UMTA/DOT. (April 1982). Paratransit services for the transportation handicapped. Washington, DC: DOT/UMTA.

UMTA/DOT/FHWA. (March 1981). Rural and small urban transit manager s workshop: Student workbook, Vols. 1 & 2, .

University of Oklahoma, School of Civil Engineering and Environmental Science. Paratransit resource guide. Washington, DC: DOT/Technology Sharing Program.

Urban Mass Transportation Administration Unviersity Research Conference. (1980). The future market for public transportation peak period transit services: Strategies for the 1980s (Panel sessions of the Urban Mass Transportation Administration University Research Conference). Washington, DC: DOT/UMTA.

Urban Mass Transportation Research Informtion Service. (August 1982). Urban transportation abstracts. (Vol. I, Part 1). Washington, DC: UMTA.

Valente, P. (International City Management Association). (1983). Public transportation training package. Wahington, DC: DOT/UMTA.

Wegman, Bell, et al. (November 1978). The Knoxville transportation brokerage project (Vol. III: An Eighteen Month Evaluation). Washington, DC: DOT/UMTA.

Weisbrod, G.E., & Eder, E.S. (Cambridge Systematics, Inc.) (June 1980). Evaluation of the Minneapolis ridesharing commuter services demonstration. Washington, DC: DOT/UMTA/OSMD.

Young, D. (March 1983). Transit in transition: Major changes ahead. Mass Transit, p. 4.

Yukubousky, R. & Fitcher, D. Mobility club: A grass-roots rural and small town transport concept. NY DOT, PRR 69, Aug. 1974.